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ABSTRACT

Focusing on new frontiers in college and adult reading, the papers in this volume were drawn from the fifteenth annual meeting of the National Reading Conference held in 1965. Among the topics covered in the 26 papers are the following: reading in the Guatemalan environment, the use of instrumentation in reading, correlates of concentration, the cloze procedure, reactive inhibition and reading achievement, reading/study skills instruction, adult illiterates, the language of the socially disadvantaged, literacy programs throughout the world, reading research, learning theories, conceptualization in learning to read, personality factors and the development of successful readers, content area reading, mental content, classroom social organization, linguistic fallacies, a psycholinguistic view of reading comprehension, reading improvement through vocabulary development, a televised speed-reading experiment, and measuring reading performance. (FL)

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New Frontiers in College-Adult Reading

FIFTEENTH YEARBOOK OF THE NATIONAL READING CONFERENCE

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Edited by
George B. Schick
and
Merrill M. May
Purdue University

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LESTER VAN GILDER
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PREFACE

The Fifteenth Yearbook of the National Reading Conference contains the papers presented at the Fifteenth Annual Meeting which took place at Southern Methodist University, Dallas, Texas, on December 2-4, 1965.

The papers have been compiled generally in the order in which they were presented at the conference, with but two exceptions: the invitational address at the annual dinner meeting has been placed first, while the annual comprehensive summary of research in college-adult reading has been used as the final article.

The editors wish to give full acknowledgement to Eric L. Thurston of Louisiana State University and to Lawrence E. Hafner of the University of Georgia for their assistance in the early stages of the production of this annual volume.

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Reading in the Guatemalan Environment

Ralph D. Winter

Mam Christian Center, San Juan
Ostuncalco, Quez. Guatemala, C.A.

INTRODUCTION

I would be really well-qualified to give this talk tonight if for my lack of technical knowledge in your field I could just substitute somehow my great respect for what you people know. This is one warning; I have another.

I cannot imagine what would happen if all the people in the United States were to discover Guatemala. And lest that happen I must make no mention of its fabulous beauty and ideal year-around climate, its picturesque Indian costumes varying from village to village, and its spectacular lakes and volcanic peaks. If by any accident I do happen to refer to these things in my talk this evening, I trust that you will accept this information in confidence and try your best to keep it from getting out to the general public.

Thus we must think about Guatemala simply as a laboratory of human diversity. And if you would like to go down there, you can justify your trip in purely academic terms. You don't have to say anything to your friends or neighbors about the tourist attractions.

No other country in Latin America is anywhere near two-thirds Indian. Guatemala is on our doorstep. As a next-door neighbor of Mexico, it is a lot closer to the Eastern United States than California is, and only two hours from New Orleans by air. For this reason, you will find Guatemala both refreshing and stimulating. It is awesome too, for its sleeping Indian giant is awakening; and in view of racial tension in this country, it is difficult to imagine all the possibilities the future holds for Guatemala. Ironically it is again King Cotton that is sweeping in to cause the biggest disturbance, bidding well to taking over the whole south coast, throwing thousands upon thousands of Indians out of work. These Mayan descendants can no longer return to their mountain plateaus where the accompanying population explosion has long since grabbed the space they left behind.

But Guatemala has the great advantage of its smallness. It has the manageability of a state government and yet the complete autonomy of a national government—no confusion about State's rights, no failure of understanding between sections due to sheer geographical distance. Guatemala may yet successfully combine the steadiness and brilliance of the Mayan Indian with the Roman thoroughness of the Spaniards, without succumbing to the volatile individualism that so often characterized Latin America.

But back to the point: Guatemala may help us become more keenly aware of diversity in the United States precisely because its own human diversity is so radical that we are forced to take diversity itself into account. Let us pursue then, this matter of cultural diversity and see how it affects what we believe and do about reading. And let us look both at and from Guatemala. My title speaks of Guatemala's environment. I have tried to justify for this particular gathering why I am talking about Guatemala. Let's go on now to my loaded use of the word "environment."

INTRA-TRANSLATION

The Mystery of Bainton's Book. There is a gem of a little children's book in English that is a flop in Spanish. It is written by Roland Bainton of Yale, who recently did the text for the huge picture history of the Christian Church published by *Horizon*. He wrote the little book for his grandchildren. It also is a history of the Christian church, called *The Church of Our Fathers,* and has worked so well with children that the United Presbyterian Church here in the United States has published more than a quarter of a million copies for use as a standard Sunday School text. Why doesn't it go over in Spanish? It is a children's book translated by a Latin American scholar into a scholar's technical Spanish. As a matter of fact, I suspect that the Spanish dialect into which it was translated is more authentically that of a sophisticated scholar than is the original English authentically a child's language. In any case, in English it is marvelous and in Spanish it is in a way monstrous.

A number of observations are possible. First of all Dr. Bainton himself probably had a hard time trying to get the book into a child's English, even granting he was quite familiar with his grandchildren and had had a considerable amount of experience in communicating to them. In trying to analyze the task he performed we may for the moment call the matters of vocabulary and grammar the lower-level linguistic problem, and call the matters of content, figures of speech, and illustrations the upper-level linguistic problem. Dr. Bainton obviously had to deal with both levels—he had to use language the children would understand, and he had to talk about events in a way that was meaningful to them. Let's just suppose that his intuition as to what content would be appropriate to children—that is, his handling of the upper-level linguistic problem—was better than his command of the lower-level linguistic problem of adapting himself to the vocabulary and syntax of his grandchildren In that hypothetical case he might have done better to write it for content and then let a specialist in children's literature translate it down. That is, handle the upper-level problem himself and let a specialist handle the lower-level problem. This specialist's task would then be precisely what I am for this evening going to call *inter-translation*: that is, careful technical translation from one dialect to another within the same language. This term I'm using to refer only to the lower-level problem, and I refer not merely to regional dialects but also to social dialects.

A second hypothetical case would exist had the good professor let a specialist in children's literature work with him even on his use of illustrations, figures of speech, and in his selection of content. This specialist's task would handle the higher-level linguistic problems, and is what I am going to call *transduction*, just for this evening.

However, I want you to understand that I am mentioning these two problems—that of the lower and higher linguistic factors in producing a children's book—for my own special reasons this evening. I feel Bainton did a beautiful job in these two respects of the actual language and appropriate content for children. The actual problem is not Bainton's fault, and exists only in the Spanish version.

This process of intra-translation into a children's dialect can still be done with the Spanish version we have, except that it is an economic tragedy that this was not done before it was printed. The book's problems so far in Spanish may not allow it a second chance in a different Spanish dialect.

Is Our Slip Showing? One reason this whole mistake was made was the distressing absence on the Spanish side of the idea that there could be differing and yet entirely legitimate dialects within the same culture. This fact is not as well accepted in the Spanish world as it is in the English tradition. Nowadays no one is trying to stamp out London English or New England English. We don't think it barbarous any more for special editions of *Gulliver's Travels* and *Robinson Crusoe* to be written for different levels of public school students. And we can't imagine anything like the Spanish Academy trying to legislate for the whole English-speaking world. In Guatemala, however, the Spanish equivalent of impenetrable legal English is widely used even in everyday administrative letters. There the idea so popular here of the Art of Readable Writing really hardly exists. The difference seems to be that in the United States anything written down that you can't easily understand is always the fault of the writer, whereas something that is hard to read in Spanish is the fault of the reader: it is always the reader that is not well enough educated. Perhaps only in Latin American newspapers is any concession made at all to what may be a growing use of a readable written Spanish. We may fervently hope that a law school thesis will not long continue as a textbook for our Indian and Spanish seventh graders.

But even in the United States our approach to this problem may still be all too casual. What we do mostly by intuition ought perhaps to merit more technical study. Does our poverty program prepare some of its materials not only in readable general English but in the exact dialect of the Appalachian readers? Does our Job Corps print materials in the inner-city sub-dialects of English with which they are working? I don't know. If so, and if it is done by specialists, then this is the sort of thing which I am calling intra-translation, translation from one dialect to another. For the Job Corps intra-translation might merely be a means of superior communication. But for the reading expert, it can be a means of isolating the problem of reading from the related problem of sub-dialects. I don't say this is always desirable, even to the reading expert, but it seems to me that it ought to be a clearly defined possibility.

History and the Reader's Digest. It is at least obvious that those of us who are concerned about helping all kinds of people learn to read more effectively must also be concerned that effective intra-translation be utilized in reaching the many social and regional subcultures of our great society. We in the United States still have further to go in making sure that written English, where we want it to be, is fully accommodated to the language of the reader.

Our own history, however, should temper our enthusiasm for instant success in other countries. If we recognize how long it has taken us to come as far as we have, then only can we be properly awed by the proportions of the task we still face both here but especially overseas.

In other words, it is not that intra-translation is a new idea. The tragedy is that so many years have gone past without an old idea catching on more effectively. Meeting as we are in a Methodist institution, it would not seem inappropriate to refer to the founder of Methodism. One scholar has recently called him history's greatest antecedent to the *Reader's Digest*. He was certainly one of the most influential men in the history of the English-speaking people, living in the great transition century of England, the 18th century, and contributing a great deal to that very transition. John Wesley had the best education you could get. As an Oxford don, his turn came up to lecture periodically at Oxford even after his own ecclesiastical movement had reached heretical proportions. His career shocked a good many sensibilities for all kinds of reasons. He went from the ivory tower to the coal mine, from the sophisticated classroom to the vast outdoor mobs that more than once nearly did him in. He went from philosophical endeavors to practical politics, and the results were momentous changes in English courts, in prisons, insane asylums, and even in modes of execution. A whole vast array of reform laws affecting children, slaves, prisoners, etc. are directly due to his influence. In academic circles, however, the most scandalous thing he did was none of this, nor even his running circles around the clergy of his day. It was what he did to the King's English. Oscar Sherwin, professor of English at the College of the City of New York, points this out graphically in a recent book on Wesley. Wesley, he notes, not only wrote two hundred and thirty-three books from scratch, but abridged, edited or revised another hundred. He not only wrote grammars of six different languages, but he literally wrote in different languages when he addressed his differing English hearers. But when he went to the common people of the English towns and hamlets, his shifting of linguistic gears was truly phenomenal. To be sure, the scholars did not follow after him and listen, but they did notice the drastic phrase by phrase editing suffered by thousands of pages of classical literature, which he intra-translated and republished in one and two-cent booklets. Wesley, as a matter of fact, single-handedly created for the first time a healthy popular literature in England, cheap enough for the coal miner to purchase. Sherwin (1:272) describes the diversity of his literary endeavors in this way:

> Wesley, "the greatest popularizer of the age, opposed diffuseness in writing, and leveled the most industrious abridging pen before the Reader's Digest. This open air preacher to ignorant mobs was also an "historian, a biographer, a magazine editor, a writer of medical treatises, a producer of novels, a lexicographer, a translator of poems, a music critic, a philologist, a grammarian in half a dozen languages, a writer in natural philosophy, a poetry anthologist, a writer on logic, a political controversialist, an economist, an ecclesiastical historian, a Bible commentator, and one of the most thorough literary dictators in history."

Wesley not only modified what could be called classical literature, but in his zeal to speak in the common tongue, he even republished *Pilgrims' Progress* in a drastically modified form.

Shakespeare in Prison? Looking back across the intervening two-hundred years, it would be fair to suppose that the fury and influence of men like Wesley have produced in the English-speaking tradition a relatively unique attitude toward the use of language. Who knows where we would be except for the almost religious passion of men like, say, Lincoln for directness and simplicity in expression? In any case, we have not gone far enough. We talk about simple, readable English, but yet there is not a line in Rudolf Flesch that refers to readability in sub-cultures. And the teenagers we want most to reach are isolated in great part by dialectical barriers. If we are so zealous to preserve the purity of so-called Standard American English, how is it—so I understand—that Shakespeare is better known and loved by the German student of today than by those underprivileged students who merely speak Standard American English? Here is the point. Shakespeare had to be translated into German, of course, and the German translation happens to be much closer to standard German today than is Shakespeare's English to ours. But if Shakespeare's original style can be trusted to full translation, why then, I ask, cannot we dare to intra-translate it? Why are we content to imprison

Shakespeare in the particular sub-dialect of his day? The answer is immediate: we do not yet believe in intra-translation. Wesley's foes are with us still. We have yet to develop, even in the United States, an effective, scholarly tradition of intra-translation.

If such is the situation here, what pray tell is true overseas in cultures that have never experienced a Wesleyan revolution in popular literature? A U.S. expert in fundamental education may sit down with a man who is the product of a Latin American university and in discussing literature for the common man find that he is separated from his co-worker by a two-hundred year gap. Perhaps our best hope is in academic societies such as this one. Here the urgency of intra-translation can be given academic and technical validity.

Someone at about this point will say, "But, really, are you seriously pressing for the production of literature in slum language?" I will agree in advance with this person that the slum kid or adult may be as much handicapped socially by the language he speaks as by his lack of reading skills, perhaps more so. I'm sure it is often true that the college freshman not only reads slowly and ineffectively but is also disastrously unacquainted with scholarly English. This type of double problem is even more seriously true of the Guatemalan Indian. Indian children reading Spanish primers face unknown words as well as strange letters. But I assure you on this point that all down through the hemisphere the technical battle has been very nearly won,[2] proving decisively that it is best in the long run to teach an Indian how to read in precisely his own language whatever it is, and then let the learning of a different language depend in part on that prior reading skill. We know now that it is much harder to try to teach reading and at the same time a language not fully native to the speaker.

In other words, I think that the wider distinctions between foreign languages and the narrower differences between sub-dialects are none the less quite comparable. I would like to lift the necessary intra-translation between sub-dialects to the level of importance of ordinary translation between totally different languages. In this audience I do not need to review the scientific facts upholding the linguistic legitimacy of even the slum language, however limited and undesirable such a language may be in terms of the broader culture. But we have to decide what we are trying to teach at any given point. Judging by Guatemalan Indians struggling with printed Spanish, I would suppose slum kids and even college freshmen could be more easily taught respectable English by oral techniques and by movies and even television than to be introduced to this additional complication in initial reading experiences or even in later speed-reading courses. It perhaps ought to be a rule of thumb that only when the majority of what a person reads is in his own precise language can the process of reading itself ever become a happy experience.

TRANSDUCTION

Sheep in Reform School. Up to this point we have mainly discussed the possibility of improving readership by eliminating through technical intra-translation the often unnecessary burden of dialectical differences. But of course it is obvious that dialectical differences involve more than vocabulary and syntax. This lower level of minute mechanical differences is a warning signal of other far more profound cultural contrasts. And if we want to talk about these other factors, we must see that the common reference of the word "translate" is far too limited.

I would like at this point then to move on finally to the higher level already mentioned in my initial illustration about Bainton's book for children. The flat planar general meaning of the word *translation* is more or less confined to the substitution of brick-like words and the replacement of their grammatical mortar. But what I have called the higher-level linguistics factors constitute a kind of third dimension that is constantly present. This is well-recognized by specialists in translation. Rather than to try to extend the meaning of the word *translate* and to have to fight against the restrictions of its usual meaning, I have thus picked almost at random the related word, *transduction*. This can then refer to the higher level and safeguard a broader concept of cross-cultural communication. The electronic technician uses the word *transducer* to refer to an ordinary speaker whenever he wants to lay stress on the fact that a speaker *transduces* an electrical message into physical, non-electrical sound. A transducer is, according to the dictionary, *a device which enables the power of one system to be supplied to a second system.*

A reform-school chaplain[3] may find that a modern-speech translation of a Biblical parable still leaves his charges cold. He then may in his desperation recast the parable of the lost sheep into a story of a car-lot owner who seems to abandon interest in ninety-nine cars in his anxiety to find the one that was stolen. In the special dialect, of course, it is not a car that is stolen but a heap that is snitched—that part is mere intra-translation. But the recasting of a sheep herder into a car lot is *transduction*. The inner meaning in the one cultural system has thus been transduced into the second cultural system—we hope with high fidelity to the original if not in stereophonic sound.

The Indian Wave-length. This new term can help us sound out a whole additional realm of consideration if we are serious about reducing the problem of reading to its essence. We agree that language not familiar to the reader leaves him confused and heightens unnecessarily his reading progress. But this may be nothing compared to the disturbance created by unfamiliar figures of speech, analogies, and content that are culturally strange or irrelevant. Language can leave him confused, but content can leave him cold. The higher factors are probably more important than the lower; and thus proper transduction is likely even more important than proper intra-translation.

Guatemalan Indians can seem slow, resentful, or even sub-normal although they are actually perfectly intelligent when you are on their own cultural wave-length. The outsider may consider the Indian incredibly stupid because he has no idea about the inner workings of an automobile. But the thing that is uppermost in the Indian's mind is more likely the incredible stupidity of the outsider who doesn't even know how to make his living from the land, and who passes by or even through their homes and fields blind as a bat to hundreds of distinctive elements and signals within their culture.

Interestingly enough the parable of the lost sheep which goes over like a lead balloon in Chicago is a parable impressively suited to the Indian in Guatemala. In fact, the man from the States whose background is city culture will discover that the Bible is a rural book which goes over far more effectively in general in the non-western countries than it does nowadays in the urbanized West. This sort of problem is not one of merely translation then, or even intra-translation, but clearly also of transduction. In Guatemala, the intimate familiarity with the threshing floor, the wheat and the tares, the wind blowing the chaff away, the sowing of seed in good versus rocky ground, the Biblical preoccupation with animals in an agrarian culture—all of this is vibrantly significant, even to the Guatemalan Indian. So much so, that looking back on the United States one would suppose that nowadays the Bible would have to be completely recast in order to go over. In fact there are some people who think this is true. I know this, that no amount of exact translation will clear up passages like the turning of the other cheek and the going of the second mile. Proper transduction from the Arab culture gives these phrases some very different meanings.

TRANSFORMATION

This is enough about transduction, since it fits into the general pattern of what we have said about intra-translation. Both intra-translation and transduction are means of accommodating the written materials to the culture of the reader. Now how about changes in the reader's culture itself that affect the use of written materials? For this purpose I have picked another word out of the air: *transformation.*

Here I would like to refer to the fact that not merely the language in which a document is written, or the things about which it speaks, but the very idea of paper and ink and communication in written signals may be something foreign in a given situation.

Cultural Out-moding. I read the other day about a teacher who tried to get the children to escape their mental block about reading by learning symbols through songs. I actually think that the underdeveloped countries of the world are worse off in regard to the development of literacy and reading skills than was the United States in its own historic era of massive general concern about literacy, precisely because of the pervasive infiltration into today's non-western countries of other more direct means of communication. I watch Indians carrying around tiny transistor radios, and in small towns I see them huddling around television sets, and I wonder if this isn't actually a kind of competition against the printed page, which causes extensive damage to the traditional cultural reasons for reading before reading even gets started. Even in the United States the souped-up classroom of today may be getting away from reading to some extent precisely due to the success of the high powered audio-visual techniques.

In somewhat the same vein, I am puzzled when I watch an Indian using an adding machine and I know he couldn't do the same job with just paper and pencil, even at a slower pace. But back to reading again.

We are involved here in what may be cultural decay. Let me use a parallel. Reading and driving have a lot in common. On some roads you can go fast; on others you must go slow. You have to take your cues from what signs and signals you encounter. Some roads are harder to drive than others. Not too long ago we spent two weeks in a little forgotten border town called Tacana in Western Guatemala. It used be in the stir of things because the mule teams from Guatemala City to Mexico City went through Tacana every day. Now Tacana is forgotten. The last visit from our center had been eighteen years earlier. These people aren't any farther away from anything now than before, but the culture has been transformed to make them rural. They weren't rural before. Now they are. No one was rural until the modern highway made all other roads impassable-by-contrast to modern man.

May not the same thing happen to reading? I envision childrens' libraries in the very near future that will still have a small book section, yes, but also long stacks of film cartridges and a couple hundred booths where children can plug in cartridges on any subject and see instant sound-color movies of what they are interested in. This will start with staid documentary clips, then historic fiction, etc. But soon scholars will be putting their own research into this form, and research libraries too will have cartridge booths. On we'll go to a glorious new high in communication and to a further stage in the decay of the older role of reading.

As a society, we have already laid aside the perusal of hand-written manuscripts and very nearly done away with long-hand letters. How many long-hand letters do you read in a month? We have laid aside the five-volume novels that were in wide use in the age of Voltaire. Skillful intra-translation and proper transduction can increase reading interest for many. But cultural transformation may out-mode the use of the printed page faster than more effective intra-translation and transduction can enhance it.

Can reading also be *in-moded* through cultural modification? Where you see this happening, again it is often to a great extent unintentional.

Cultural In-moding. Protestant churches around the world are sometimes criticized for barging into a situation and re-making the culture. On the other hand, many literacy experts recognize that only if a newly literate person is brought into a minority sub-culture in which reading is a highly valued skill will that person continue to develop rather than to go backward in his reading ability. And it just so happens that the Protestant churches all over the world have created this type of reading sub-culture. They have modified the dynamic cultural context for the reading art itself.

Another similar pressure which has developed in our area in the last five or six years is merely the outstanding new interest the adults have suddenly gained in primary education. I have implied that transduction may often be more important than intra-translation. I wonder if the transformation of the culture itself in regard to the reading art is not in the last analysis more important than either of these first two techniques. We have seen, for example, rural people who are basically uninterested in either the unfamiliar language or the unfamiliar content of the public school curriculum, but who are willing and able nevertheless to grapple with infinite pains with this program in their desperate eagerness to become first-class citizens. This new attitude toward primary education is itself a transformation within the culture which only accidentally affects reading. We have developed a kind of adult education which rather drastically forces adults to *read* in order to *learn*. In dispersed rural population areas, there is neither money nor the geographic possibility of getting people together in classes and thus permitting them to avoid reading itself as a means to the end of education. Our program constitutes only a very minute alteration of the culture in order to require reading skills to be developed. A book is forced to take the place of the classroom they will never see. Our extension adult-education program certainly requires reading far more than does the village

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schoolhouse in which there is often not a single sheet of paper on which words are printed.

An impressive demonstration of the greater influence of non-linguistic factors in a given situation is that series of events in which you first see an adult leader in a village area who will by unusual effort gain his diploma, and then there will be a steady stream of perhaps twenty others who will shortly gain that diploma and another two or three hundred who are now seriously concerned about learning to read for the first time, and finally on the level of the children in the community, maybe a thousand or fifteen hundred who are going to be sent to school by their parents with a determination and an eagerness that has never before existed. This is my own vision about the priority of adult education as opposed to greater funds invested in schools for children. Many of the rural schools are not even taxed to their capacity, and yet not more than twenty per cent of the children ever go to school. Why? In the Indian culture a seven-year-old child has a dollar and cents value in the household economy, and is often deliberately and strenuously withheld from school beyond that age. Quite obviously there need to be strenuous cultural factors far beyond linguistic modification of reading materials to get that child into an environment where reading is important or necessary and thus where effective reading skills are likely to develop.

CONCLUSION

We have seen hundreds of Indians come down out of the mountains and sit down at a school desk perhaps for the first time in their lives and take an examination for a primary school diploma. This may be the first examination they have ever taken and the first time they have ever been in a school building. But many of them pass these examinations. This development in the last couple of years has surprised many people, ourselves included. I am not less concerned about proper intra-translation and transduction than I am about cultural transformation. But I must say that I am truly impressed by what can be accomplished by cultural transformation in the realm of attitudes and interests as weighed against sheer mechanical techniques. And as I look back to the United States and sense the phenomenal amount of information that is now channelled through tele-communications other than the printed page, I have wondered if perhaps even our own culture is not facing a crisis in regard to reading and the printed page. They say that companies producing carbon paper are going out of business due to the competition of the office machine copiers, and that the use of paper and the printed page is on the upswing more than ever in the history of western men. This may well be true for a good proportion of our people, perhaps even for the majority. But if all these new means of communication will produce even for a minority a new way of life that involves the printed page less, then as a result, those of us who are concerned about reading will quite obviously face a tougher task than ever before. Perhaps our culture will increasingly require more and more reading on the part of some of us, but proportionately less and less reading for the rest. Who knows, reading may become, like calculus, something for which not everyone will feel the need. Your crystal ball is as good as mine, but it surely does not look as if the college reading expert is going to be put out of work.

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The Use of Instrumentation in Reading

Brother Leonard Courtney

St. Mary's College, Winona, Minnesota

For purposes of organization, this paper will be framed around three questions:

1. What are the instrumental materials and how may they be classified?

2. What are the claims made by the more ardent advocates of these materials and how does research justify these claims?

3. How may these materials be used most effectively in the improvement of reading competence?

In other words, I shall attempt to establish the fundamental theory and the principles underlying commercialized instruments for the improvement of reading and provide a practical rationale for their use.

INSTRUMENTAL DEVICES: TYPES AND CLAIMS

We may roughly distinguish three types of instruments. 1. Tachistoscopic ("to see, mark, or aim swiftly") devices which employ a variable speed shutter attachment (perhaps on an overhead projector) to flash objects, groups of objects, numbers, letters, phrases on a screen in speeds which may vary from a second to 1/100 of a second. This is a static situation, that is, the students—individually or grouped—focus continuously on the screen, prepared to note instantaneously the projected material, which they are usually asked to jot on a paper for later verification. 2. Instructional or training films or filmstrips for reading improvement: the principle is the same here as for the tachistoscope except that the material is continuous with a moving band or slot of light directing the reader's eyes across a line of print which is alternately brightened and then darkened; this, too, may be done at varying speeds. 3. Those instruments—variously called accelerators, pacers, shadowscopes, etc.—which force the reader to read more rapidly than his accustomed rate by means of a descending shutter, rod, or band of light. Some of the more sophisticated instruments are intended to perform more than one of these tasks.

Historically, reading-improvement instruments have progressed in their mechanical efficiency while moderating the scope and stridency of their claims. One of the earlier devices, the Keystone Tachistoscope, is a simple over-head lantern-slide projector with a camera-like shutter placed over the objective lens and manipulated so as to expose materials in fractions of seconds, varying from a full second to 1/100 of a second. Hundreds of slides of different kinds are available for perceptual-span development: phrases and sentences, the Dolch Basic

Sight Vocabulary and Nouns, jumping digits, basic forms and familiar forms. The idea is to advance gradually through forms to digits to words and phrases—always broadening the span of objects and shortening the duration of the fixation. Brochures concerning the material explain how an entire reading and study program may be built around this instrument. In more recent years, the claims of purveyors are more restrained and modest, more in line with the conclusions reached by independent investigators.

One of the more popular film instruments is the Controlled Reader of the Educational Development Laboratories, which is described as presenting filmstrip material to develop left-to-right control techniques; it includes pictures, sentences, story materials, all presented at rates varying from 60 to 1000 words per minute. There are eight sets of material for developmental reading training on the secondary, college and adult levels; two each for Grades 2-8, 9-10, 11-12, 13-14. The company's literature makes no strong claims, recognizing that research has not documented the reality of controlling eye movements or of training students to read in fixation patterns—one, two, or three fixations per line.

Accelerating devices, whatever method they employ, provide paced reading practice under timed conditions, with the improvement of reading rate as the stated goal.

Though an occasional salesman may make extravagant claims for his particular product—particularly if the "pigeon" has money, is eager to buy, and obviously not too enlightened—current claims of most manufacturers of instrumental aids in the teaching of reading are relatively restrained and modest. There was a time, however, when the common argument was that these instruments were almost infallible means of improving the *quantity* of material read, usually by decreasing fixations through improved phrase seeing, shortening both the span and the duration of fixation, and cutting down on the number of regressions made while reading.

Research in eye-movement photography in recent years has revealed some definite facts regarding these characteristics. Taylor, (13) for example, has found that the reader is able to see only four or five letters immediately around the fixation point with 100% acuity; more than one-half inch outward from this point, material is seen with but 30% acuity. If vision is less than normal, this fall-off is more pronounced. The usual college student has a usable span of recognition of only 1.1 words and even superior readers seldom go beyond 2.5 words per fixation. Confirming this, Perry and Whitlock (9) have shown perceptual span to be about 8-10 letters for normal readers in connected reading. Finally, the efficient reader spends about 10% of his time regressing, and the inefficient reader may spend as much as

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30% of his time in regressions. Spache, (12) in reviewing the literature from 1946, did not see any evidence that mechanical training results in eliminating regressions or in markedly decreasing the duration of fixations, or in increasing perceptual span, or in reducing fixation frequency. He considered most of these eye-movement characteristics to be "closely related to the reader's reactions to the difficulty of material, and to his purposes in reading it. . . . they are reflections of the reader's difficulties with vocabulary and comprehension, not necessarily primary indications of the level of the reader's skill in reading. These traits are not consistently different for good and poor readers; nor are they consistently related to reading speed." Furthermore, Spach points out that "regressions are essential and desirable for accurate word analysis and thorough comprehension"; that "duration of fixation may be physiologically determined at a rather early age"; finally, he notes that fixation frequency is not highly related to reading speed; that differences between good and poor readers are not consistently large or significant; that fixation frequency is markedly influenced by the purposes of the reader, the difficulty of the selection, as well as the format and the reader's background for the content. (12:190-191)

This is the weight of evidence which has caused many publishers, manufacturers, and directors of popular programs to moderate their claims. Nonetheless, others persist with outlandish enticements and just plain foolish recommendations; some of the more popular independent reading programs recommend the reader to count his own eye movements, regressions, etc. and then undertake to control them. Besides being patently illogical, this flouts all experimental evidence.

RESEARCH IN THE USES OF INSTRUMENTATION

In 1959, Smith and Smith (11) divided 84 college students into four classes, two control and two experimental; two different teachers took one section of each. The E-group used Percepto-Scope material, following the manual faithfully with t-scope training, paced reading films, vocabulary training from words in films, tests and talks on reading—all as prescribed. The C-groups were book-centered, using a variety of college-level texts; talks and motivating directions were given and speed was emphasized. It was found that neither group made any significant gain in vocabulary; the E-group dropped in comprehension where the book-centered group gained in comprehension; both groups made impressive and significant gains in speed. The investigators concluded that the Percepto-Scope was not needed by the trained reading teacher but that the untrained teacher who followed the manual faithfully could accomplish as much as a trained teacher in terms of speed. It was likewise noted that the students did not respond to the reading films because the vocabulary was not sufficiently challenging and that students striving for speed tended to skip more difficult passages.

In another experiment, Warren (15) matched two selected classes of junior high students on the Iowa Silent Reading Test although the experimental group had a lower mean IQ than did the control group. Both groups had training three times a week for seven weeks. The E group used the EDL Tach-X with digits and ten words which were copied after exposure and the EDL controlled Reader as directed. The C-group used hand-held cardboards with identical digits and copied the same words. They likewise read the same selections exposed on the projector, while timed and motivated to read better. Vocabulary development, comprehension quizzes, etc. were the same for both groups. Warren found that both groups made excellent gains for such a short period but that the E-group made greater gains in "rate with comprehension and in relative efficiency." The C-group made greater improvement in comprehension, "possibly because the teacher made use of the SQ3R method of study." She concluded that a balanced reading program should stress a variety of techniques for best overall results.

Mayhew and Weaver (6) divided 96 university students into four groups governed by four sets of conditions, employing different materials in each: 1. the Harvard Reading materials; 2. the SRA Better Reading book and folder; 3. the Harvard films and t-scope; and 4. alternating between the SRA and the Harvard Reading materials. Their conclusion is quite interesting: "It is obvious that it is not necessary to own a tachistoscope or reading film to improve reading skills. Gains under Condition I, II, and III were almost identical, suggesting that almost any selection of reading materials which is relatively homogeneous in reading difficulty, will be as effective as expensive equipment." They noted—as do most of these investigators—that it was easier to motivate the students using the machines.

A comparatively new type of instrument is the Craig Reader, a machine that resembles a small television set and has considerable eye appeal to students. Reading material is on plastic strips which are fed into the side of the machine and flashed on the screen one line at a time at speeds which are regulated up to several thousand words per minute. The machine can also be adjusted to operate as a t-scope, "flashing phrases on the screen at speeds that prevent an individual from making more than a single fixation in comprehending them" [sic].

Murray and Erickson (1) recently reported an experiment using this instrument. They matched two sixth-grade classes on the Lorge-Thorndike test; all students were tested with the Gates Survey before and after. Methods were kept standard in both groups except that the

E-group used the Craig Reader for thirty minutes each day during the eight-week experiment. No differences between the groups in rate, comprehension, or vocabulary were significant at the 5% level, although the E-group was higher in all three. Teachers were overwhelmingly in favor of the Craig Reader because of superior motivation deriving from it. The investigators hypothesized that the slight superiority of score favoring the E-group might become significant if the experiment were extended over a longer period of time.

Martens (5) in 1961 conducted a 20-week investigation with two groups of students, twenty-four in each group, of above-average intelligence (Mean IQ 112). Both groups met twice weekly for forty-five minutes. The E-group used pacers, the C-group did not; every reasonable effort was made to keep all other variables equal: teacher, time, motivation, instruction. The E-group spent ten-plus minutes per period on the pacer; the other group read the same materials at their own speed under ordinary conditions. She found that both groups gained in rate and in comprehension; the E-group more in rate, the C-group more in comprehension. She re-tested both groups six months later and found improvement still significant at the 1% level. She noted that the E-group seemed to make quicker but less permanent gains as measured by the Iowa Silent Reading Test, but the gains for both groups at the end of training were roughly twice as much as at the time of follow-up although the gains were relatively permanent. The apparent improvement of the E-group was greater than for the control in all three tests but the differences were not significant. She concluded that there was no real difference in improved reading skills between the two groups, nothing that favored the pacer. She said that the reading pacer, while admittedly useful for its motivational appeal, is not absolutely necessary for the success of a reading program.

Many other comparative experiments are available but their evidence is no more conclusive; findings are often contradictory. Although many studies are admirably designed and executed, frequently there are inconsistencies which dilute solid confidence in the conclusions. Some experiments are incredibly sloppy; many suffer from inadequate controls, "Hawthorne-type" effects, insufficient subjects, poorly equated groups, faulty teacher quality, and even a detectable bias toward the experimental situation in materials, methods and motivation.

Contrasting results, for example, can be noted in two fairly similar experiments, both studying the value of the Controlled Reader as compared to a "standard" reading approach with fifth graders. In the 1958-59 school year, Bottomley (1) examined a variety of effects with a large number of fifth and eighth-grade pupils from two different schools in contrasting socio-economic neighborhoods; students were tested at the beginning and end of the program and again five months later. In 1963, McDowell (4) contrasted the effects of the Controlled Reader with a regular developmental program with thirty-two fifth graders. Both examined the changes in rate and comprehension. Whereas Bottomly arrived at some conditional approval for the advantages of the Controlled Reader, McDowell found no significant differences in any of the variables, and neither of his groups demonstrated any excessive growth.

More careful scrutiny of these two experiments reveals the internal differences which might produce their conflicting conclusions. Both investigations were carefully controlled, particularly in the matching of the groups. Where McDowell had a very small sample, Bottomley's was larger but from disparate levels and backgrounds. McDowell observed both the Controlled Reader program and the basal reader program exactly as directed by authors or publishers. Bottomley's E-group, however, followed a more flexible Controlled Reader program, constantly adjusting size and suitability of the students to the program; on the other hand, his C-group followed a singularly free reading program, poorly defined in its aims with the approaches largely based on "pupil interests."

Considered individually, each is a good study with justified but restrained conclusions consistent with purposes and findings. But how is the inquiring student or teacher to find guidance for his own planning from such conflicting viewpoints? Perhaps his own preference, disposition or bias will direct the final decision. And bias is abundant. I fear that even this review of the research literature on mechanized reading improvement devices reveals my own conviction—that instrumentation is not necessary for effective reading development. It is simple to find experiments and testimony to support any predisposition.

Recently, for example, I noted contrasting opinion on this matter from two respected people in the field of college reading. Schmidt supported the use of instrumentation, stating in part:

> The fact is that every day literally thousands of grade, high school and college students are improving their reading with films, pacers, and film strip devices as an integral part of the teaching programs. The results obtained in these programs, in comprehension, speed, and flexibility, have been reported until there is no question of their improvement. Furthermore, and of equal importance, is the fact that there is no full-scale evidence, gathered by the use of large experimental and control groups, that equal or better results could have been achieved without the use of the aids. (10:221-2)

On the other hand, Pauk rejects their use. He describes the evolution of the Cornell program:

> We have discarded not only the tachistoscope but also devices which expose piece-meal parts of lines and sentences which make up a story. We found that the moving slugs of light projected by the machine had a

> mesmerizing effect on the students; that is, the moving light captured the eyes of the students, but seldom their minds. . . . A third discarded gadget—sacred to most programs—was the guillotine-like shutter or bar which mercilessly severs the reader's sight if he should tarry even a few seconds to contemplate an unusual word or reflect on an engaging idea. Finally we swept away all kinds of reading films . . . for we found no academic help in them. (8:234)

His case is well supported from logic and experience. In particular, he attacks the motivational value of "gadgets," arguing that they become but crutches, denigrating the essential value of the reading material itself and confusing the student with conflicting ways of reading. McDowell, already mentioned, likewise noted that his fifth graders initially enjoyed working with the Controlled Reader but the interest waned.

CONCLUSIONS FROM THE RESEARCH

In spite of apparent confusion, those who have made extensive reviews of the literature generally agree as to the place and effectiveness of instruments in the reading program. Karlin (3:352), in 1958, after reviewing a number of studies, stated: "In 11 of the 12 investigations which measured natural reading against machine reading, the groups that received training in the former either equalled or surpassed the machine groups in rate of reading." He noted that speed improvement was possible without the use of special instruments and concluded, rather wryly, that "perhaps the monies which have been spent for the purchase of reading machines might better be used for other purposes." Westover, likewise in 1958, made the following judicious evaluation of the research on controlled reading:

> 1. Reading may be improved by training employing devices that partially control eye movements; 2. Reading may be improved by ordinary motivated practice; 3. Although there is some variability in findings, there appears, in general, to be no advantage in favor of controlled reading as compared with motivated practice; 4. Reading is essentially a centrally determined process of perception and reasoning, rather than a peripherally determined process of vision and eye movement; 5. Gains obtained through controlled reading are secured through improvement in habits of perception and organization, rather than of eye movement; 6. Controlled reading may be employed to help train habits of rapid perception and organization, if used by persons who understand the psychology of reading and the limitations of extrinsic devices; 7. Reading experts, after making critical studies of controlled reading, tend to agree that a comprehensive, individualized, motivated program of skillful instruction offers the best means of improving reading. (16:258-9)

And in May, 1960, Traxler and Jungeblut devoted four pages in their *Research in Reading During Another Four Years* to the question "What Does Recent Research Indicate with Regard to the Value of Controlled Reading by Means of Mechanical Devices?" After citing several studies, they write: "The general conclusion to be drawn from these studies is neither favorable nor unfavorable to mechanical aids. As was true of a good deal of earlier research, these studies do not indicate that any greater improvement in either speed or comprehension can be obtained through the use of mechanical devices that can be secured with more informal procedures." (14:47)

You will note the persistently recurring views: first, that controlled reading of every kind does improve reading, but no more so than a well-constructed program which concentrates on materials; second, that instrumentation seems to have a built-in motivation which is appealing to the students; and, finally, that motivation appears to be the most significant factor in rate improvement and perhaps even in general reading improvement.

SOME PRACTICAL RECOMMENDATIONS

All very well, you may say, but I already have some of these instruments. What should I do—junk them? Hardly! Perhaps we can offer some specific ideas for better use of these materials. Without doubt, the most penetrating practical rationale for the use of controlled reading devices is that by George Spache in the Proceedings of the 1958 IRA Convention, *Reading for Effective Living*. Briefly, Spache points out that

> mechanical training is successful in accelerating rate because the student is in effect being taught to read with fewer cues, to guess more readily what he sees peripherally. . . . He is trained to overcome the caution exhibited in slow or word-by-word reading, to be more confident in dealing with vague or indistinct portions of words. He learns to read more rapidly but not because of any actual increase in perceptual span or other changes in eye movements. (12:192)

He recommends that training begins with:

> groups of geometric forms, moving thereafter to word shapes, to incomplete words, to related phrases to convey to the student some insight into his purpose. He should realize clearly that he is trying to recognize word forms more accurately and eventually more rapidly with only minimal or gross clues to aid him. (12:193)

Spache goes on to suggest that the student should practice individually, that the speed of exposure be kept to a level that is comfortable for the slowest third of the group as determined by present reading rates. Speed is to be de-emphasized in all except perhaps the last stages of training in favor of accuracy of recognition of perhaps 80-95 per cent. Speed should increase spontaneously as visual discrimination and perception improve. He cautions against allowing all students to have this training; it should instead be limited exclusively to those who have adequate comprehension skills but tend to be habitually slow and inflexible. There should be no attempt "to offer rate training to any subjects who are poor in the basic skills of vocabulary or comprehension, or those with visual difficulties that might interfere." (12:194) And most authorities agree that digit-training is valueless because it has little transfer value to real reading.

One of the major problems associated with use of mechanical training devices is that of transfer of the experience to normal reading situations; without deliberate effort to facilitate this transfer, the skill remains an isolated and abortive one. Any practice with tachistoscope or film materials should be preceded and followed by short unassisted reading periods—normally and naturally—and always with some check on the quality of comprehension and the degree of transfer or improvement evident from previous sessions or the exercise preceding training.

A few other practical points: No mechanical training should be prolonged: 10-15 minutes at the very most of tachistoscope training; reading films and filmstrips customarily run 6-9 minutes; accelerator work is virtually useless—perhaps even harmful—after 20 minutes. In this latter case, it is almost impossible to sustained disciplined concentration and attention under great pressure for a longer time. All of this work should be prepared for: brief talks to motivate and provide insight into reading processes; study of difficult vocabulary that might be encountered in reading films. Though perfect homogeneity is impossible, groups should be kept as small and as homogeneous in the skill being practiced as possible; otherwise, students at either extreme of the skill become either frustrated or bored. Students should be weaned from the mechanical device and into the natural reading situation as rapidly as profitable; for some this will be quite rapidly; others might profit from longer training, if properly sequential. In using the accelerator or pacer, students should be encouraged to reach for a comfortable (or uncomfortable) maximum, read a few pages "on" the accelerator at that rate, then the same number of pages with the device "off." This should be gradually increased to that point where they are reading more without mechanical assistance than with it. Unspeeded or natural rate practice—that is, personal, unassisted efforts to read faster—should precede accelerator practice; immediately afterwards, speed and comprehension checks should be made in simple, fairly standardized expository material.

Some final points on accelerator or pacing work: many people, college students and adults, are slow readers because they are lazy readers; fast reading is disciplined reading. Whatever kind of mechanical device is employed, it must press the reader to the point of virtual discomfort. In 1955, George (2) estimated that the best accelerator setting was the Diagnostic Reading Test rate plus fifty words per minute; personally, I prefer that the student use his unspeeded rate plus fifty words per minute. Students must be carefully trained in all facets of the work and be watched and counseled during the course of practice. They must understand the nature of plateaus in rate improvement and must be encouraged to do considerable personal rate practice in private, unassisted by the machine. This should be reading of an expository nature—other than the narrative material customary to rate practice—to encourage transfer. They must be aware of the distinction between fast but thorough reading and the more specialized skills of skimming and scanning; Taylor (13:199) has pointed out that the probable limit of true reading is in the vicinity of 800 words per minute; thereafter, the specialized skills dominate. Finally, rate training should never be given a student whose fundamental vocabulary and comprehension skills are weak. Rate training is the final skill, not the most important one; it should never be a substitute for comprehension, which is the ultimate objective of teaching reading, of reading itself.

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Correlates of Concentration

Martha J. Maxwell
University of Maryland

Inability to concentrate has long been one of the most frequently voiced complaints of students who seek help from college reading and study programs. (4) (22)

What is meant by concentration? Study skills manuals typically define it as "thinking about what you want to think about, holding your mind on the subject, and excluding everything irrelevant" (26) and this is the goal toward which students aspire. In 1891, William James (16) differentiated two kinds of attention: e.g., the first was described as passive, reflexive, non-voluntary, effortless, and the second as active and voluntary. It is the latter that has long been considered synonymous with concentration. (21) Today's psychologists define attention as "the tendency of an organism to focus its attention in a given direction" (18) and tend to blur any differences between attention and concentration. Much experimental work has been done by psychologists and others focusing on aspects of the phenomenon we call concentration under such diverse titles as: focalization, resistance to distraction, relevant thinking, meditation, and zerstreuheit—to name just a few.

The purpose of this paper is to compare some of the practical suggestions that we in college reading offer students who wish to improve concentration with typical research studies and their results, and also to describe the approach we are using in our studies on concentration at the University of Maryland.

INTERNAL OR EMOTIONAL FACTORS

Many study skills manuals as well as introductory psychology texts begin their discussion of concentration by citing Tolstoy's famous quotation that the hardest thing in the world to do is to stand in the corner and *NOT* think of white bears, after you've been told to do so. (23) Then the typical manual goes on to make the analogy that consciously deciding NOT to worry about a girlfriend or other problem that may be disturbing one's studying is futile. One is told to handle one's problems by doing something if it is possible or by seeking help from a counselor, adviser or dean.

Another technique is to tell the student to make a list of all of the possible precipitating conditions of the problems that are distracting him and then list the alternative solutions or possible remedies as a way of deciding how to act. (4) Another is to advise the student that if he can't do anything about a problem at the moment, to make a note to himself to start worrying again at a later date. There may be research as to the effectiveness of these procedures, but I haven't found any.

Abrams (1) claims that it is the attention span that suffers first under emotional conflict, but as long as the individual has the mental resources and energies at his disposal, he can still concentrate. If his anxiety has affected his mental resources, he's a poor risk for a reading or study improvement program. Abrams used scales from an individually administered intelligence test to determine the individual's attention (digit span test) vs concentration (problem solving test) potential.

Students are also admonished to:

> Strive for maturity, learn to overcome your fears and worries (7), maintain good mental health by learning to laugh at yourself, be concerned with present, rather than the past or future, and develop an interest in school work (7) and the subjects you are reading. Much has been written on the emotional components of reading and study and the need for counseling in clearing up emotional blocks to learning research on the impact of counseling on reading and study is with few exceptions confined to case studies.
>
> Also they are told to eliminate doubts about a subject, work rapidly and intensely, and obtain successful experiences which will beget greater comprehension. (12, 26)

PHYSIOLOGICAL, HEALTH FACTORS AND PHYSICAL CONDITIONS

Physiological and health factors are routinely described in study skills manuals as bearing an important relation to concentration. Robinson (22) in discussing comfort factors concludes that although studies indicate that temperature conditions do not affect studying efficiency, students who studied under adverse temperature (e.g., heat) felt that they had done poorly. Therefore, he concludes that inadequate temperatures might provide another excuse for students to procrastinate from studying.

Similarly, studies on physical and mental fatigue show interesting results. The classic Carmichael and Dearborn study (6) in which Harvard students read for an eight hour period without any signs of visual and physical fatigue as long as they were being regularly tested for comprehension compared with the non-tested control group whose reading patterns fell apart in four hours is often used to illustrate the importance of motivation. Hayden (13) compared the reading scores of athletes and a matched group of non-athletes tested in the morning and evening. Although the athletes had a heavy football practice schedule, there were no significant differences in comprehension for the two groups. Both read faster in the evening than in the morning, and although she indicates that speed differences in the evening were significantly greater in favor of the non-athletes, she concludes that the physical fatigue did not affect rate.

An interesting advertisement that was distributed at a reading conference recently urged that children be helped to develop their power of concentration by providing them with book rests for reading. Although reading position may affect concentration, there seem to be more crucial concerns.

Most of the manuals merely warn students that health, and physical condition factors of the study environment, such as lighting, do affect concentration, and should be eliminated. Perhaps the motivated students compensate for these inadequacies as it appears they do for physical and visual defects.

SUSCEPTIBILITY TO DISTRACTIONS

According to James (16), intellectual activity can be so absorbing that one becomes inattentive to the external world and absent-minded. Typical of the great men of history whom he described as having this ability was Archimedes who was so absorbed in his meditations about geometry that he only became aware that the Romans had attacked Syracuse when he found that he had been critically wounded. Occasionally today we find college students who apparently can study intensively, oblivious to their surroundings—e.g., studying calculus sitting next to the drug store jukebox or the T.V. set in Student Union. However, in order to help students develop more effective habits of concentration, study skills specialists have long advocated that steps be taken to eliminate distractions. Students are told to find a quiet place, remove pictures, etc. from their desks, avoid studying while lying down, etc.

There is some experimental evidence to bear out these suggestions. Studies on the effect of music on reading efficiency show that students differ in their reactions toward music. (10) In one study, popular music was found to have a negative effect on reading efficiency, while students listening to classical music did not differ in their performance compared with a control group reading without music. (14)

The results of experiments on the effects of noise on performance are not completely definitive. Jerison and Wallis (17) investigated the effect of noise on a simple vigilance task and found that performance under the noise condition was equivalent to that without noise; thus they concluded vigilance tasks "not requiring flexibility" are not influenced by noise. Experiments dealing with the effect of noise on more complicated tasks suggest that mental work can be carried on effectively under noise conditions but that trying to concentrate against noise over a period of time becomes fatiguing. In one study (15), two forms of an intelligence test were administered, one under quiet conditions and the second under a loud noise condition. Although there were no significant differences in the students' performance on the two forms of the test, subjects working with noise more frequently reported that they were tired.

Baker and Madell (2) studied two groups of male college students equated on mental ability but differing in achievement. Each subject was given a series of addition and subtraction problems to work under four different experimental conditions: workshop noise, the voice of someone counting aloud, humorous conversation and no noise. Neither the workshop noise nor the counting affected the time both groups took to solve problems; however, there was a significant drop in the speed of computing when humorous conversation was the distracting condition, with under-achievers showing a significantly greater loss in speed than the achieving group.

In a subsequent study, Baker and Madell (3) studied the reading test performance of groups of college achievers and under-achievers under distraction conditions. This time they used only humorous conversation as the distractor and performance on the Cooperative English Test as the criterion. Under the non-noise condition, both achievers and non-achievers performed equally well, but when humorous conversation was introduced, the mean score of the achievers dropped 25% while those of the under-achievers dropped 51%.

The results of these Baker and Madell studies suggest that there may be personality characteristics that differentiate achievers and under-achievers, and that these are manifested in the greater susceptibility of the under-achiever to perform poorly under distracting conditions.

In comparing these experimental results with the realities experienced by students in college, one can see the difficulties. Robinson (21) cites a study in which extended observations were made in women's dormitories and "it was found that only 4 percent were without major distractions at the time of observation." Another study, he cites, indicates that conversation is the most frequent distractor reported by students who use the library to study, although students who study in the library have been found to make higher marks than those who do not. (22:78) Perhaps, the students who survive in college are those who can study under distracting conditions, but the question remains as to which group is creating the noise—i.e., the achievers or under-chievers.

RELEVANT THINKING

On the opposite side of the coin of distractability is the question of whether an individual can restrict his thinking to the subject at hand. A study of relevant thinking in the classroom was reported by Stern, Stein and Bloom (24) in which a tape-recording of a classroom discussion was played back to each student individually and he was asked to give a running account of what he had been thinking during the original discussion period. The methodology of conducting and assessing this stimulated recall situation had been previously described by Bloom. (5) Student comments were rated by judges for relevancy to the topic being discussed and the results indicated that there was a correlation of +.61 between the relevant thinking ratings and mean performance on the class examinations although the ratings did not correlate significantly with academic ability nor class participation. It was found also that the students whose ability scores were at the extremes had low ratings on relevant thinking, and this was interpreted as indicating that the discussion was directed toward the average student. The authors state that

> The irrelevant thinking of the high aptitude students can possibly be explained as the result of familiarity with the ideas under consideration and consequent boredom with classroom proceedings, whereas the students with low scholastic aptitude may have difficulty in comprehending what is going on and therefore are more susceptible to distractions.

James (16) observed that some persons can voluntarily empty their minds and think of nothing. This, he felt, was related to the hypnotic trance, fatigue, or reactions to a monotonous mechanical task. Some researchers have attempted to investigate this phenomenon as it concerns hypnotism and Zen meditation exercises specifically.

HYPNOSIS

There are some practitioners, (19), (8) who are using hypnosis in an attempt to help students achieve better concentration, since stress can be reduced and outside distractions minimized through hypnosis.

Father Tremonti has been doing work in this area recently and sent me copies of the materials that he has used in establishing what he terms an "alert trance state" in which the student is given very strong positive suggestions that he can concentrate and exclude outside distractions. (25) Also he has developed tape recordings on improving concentration which basically involve an auto-suggestion or self-hypnosis approach. The student is told that he can achieve complete concentration and is given the suggestion that as he continues to use this new power, it will increase. There are other suggestions on warmup—i.e., when you sit down, you will begin to concentrate at once and continue until the time you set to stop. Father Tremonti reports that this approach has been successful in increasing span and duration of attention, concentration, and mental efficiency. It will be interesting to find out what kinds of students respond well to this approach since experimental data and statistical analyses of results are rare in this area.

ZEN MEDITATION

Closely relative to the hypnotic experience are the far eastern Zen and Yogi exercises. Maupin (20) instructed 28 college student volunteers in a concentration exercise related to Zen Buddhist procedures.

In this exercise as in typical Zen procedures, the beginning student spends a portion of each day sitting motionless and engaging in concentration. The object of the concentration usually varies but in this experiment, subjects were told to concentrate on their own breathing for a 45-minute period each weekday for two weeks. Responses to the meditation exercises were scaled on a five-point scale ranging from reporting physical sensations like dizziness and inability to concentrate (low), to a complete concentration with extensive loss of body feelings, (high). In attempting to predict who would do well in this exercise, a number of pre-tests were given: attention was measured by a digit span test, concentration by scores on a continuous addition test, scanning control or attention deployment by a size estimation task and personality factors by different Rorshach measures. Neither of the attention nor concentration pre-tests predicted responses to meditation, while the Rorshach measures of capacity for regression and tolerance for unrealistic experiences did predict.

Thus, personality factors appear most significant in differentiating individuals who can successfully master Zen meditation skills.

CURRENT RESEARCH INVOLVING CORRELATES OF CONCENTRATION

For the past few months, we have been attempting to investigate some of the aspects of concentration. Our goal is to develop some simple, reliable measures that can be used in further experimentation involving testing procedures which purport to improve ability to concentrate (e.g., operant conditioning) and for individual diagnosis. For example, we would like to know conditions under which increasing reading speed improves concentration, and we would like to be able to identify students with good and poor concentration to test in experimental programs.

As the above review of the literature suggests, there is no agreement on measures of concentration and there may indeed by diffrent abilities involved—e.g., the ability to keep one's mind blank may differ from the ability to concentrate intensely on some intellectual task which may differ from the Zen task of concentrating on self. Our first concern is to learn how these different abilities interrelate.

One technique that we have been exploring is the ability to concentrate on a single stimulus for a period of time. We are using a technique developed by Pumroy (9) in which subjects are asked to concentrate on a target for three minutes and to signal when their mind wanders off the target. The three tasks used are: 1. Concentrating on a "T," 2. Concentrating on a target consisting of 20 concentric circles, and 3. Following instructions to close one's eyes and keep one's mind completely blank. Subjects signal when their mind wanders by raising a finger and it is possible to get a measure of the number of times a student reports that he is "off target" as well as the length of time he is not concentrating per 3-minute interval. Esterson (9) describes data in which subjects retested a month after initial testing retained the same relative rank in the experiment thus indicating some reliability for the Pumroy Concentration Task, but no statistical analyses were performed,

Mueller has designed a piece of apparatus called a "concentrometer" to simplify the collection of data on this task. This is a simple pressure plate which is connected to a polygraph so that the subject's signals can be recorded automatically. Previously Pumroy had relied on a stop-watch and tape recording to record responses.

In regard to the implications of this task, James (16:272) states unequivocally that voluntary attention cannot be sustained for more than a few seconds at a time, and that no one can possibly attend continuously to an object that does not change. He states that the sine qua non of sustained attention is the ability to roll an idea over and over incessantly in one's mind considering its many aspects and relations. Furthermore, he states that "only in pathological states will a fixed and ever monotonously recurring idea possess the mind." (16:274)

In one study we tested students on the Pumroy Concentration Task, and a variety of other measures and ran a multiple correlational analysis with average examination grades in educational psychology as the dependent variable.

Also data is being analyzed to determine the relationship between scores on the Pumroy Concentration Task and reading ability, anxiety, perceptual speed and accuracy, speeded comprehension of phrases and sentences, personality factors, attitudinal measures and various self-report measures of concentration.

In another study, we are attempting to replicate the Baker and Madell (2), (3) studies using humorous conversation as a distractor and performance on a simulated reading task [visual tracking (10)] as the dependent variable, and are comparing performance under these conditions with scores on the Pumroy Concentration Task, reading scores, and self-report measures.

From the studies reviewed in this paper, it appears that there may be a number of different skills involved in what we call concentration. There is evidence that some of the concentration tasks are related to college academic achievement and, especially, to the underlying motivations necessary for success. A series of studies designed to explore the interrelations between various concentration measures, personality variables, and achievement have been described.

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The Effects of Non-overt Reinforced Cloze Procedure Upon Reading Comprehension

Richard H. Bloomer

University of Connecticut

If one were to follow strictly the tenets of operational behaviorism, the process of reading is an extinction process. No overt reinforcements are given for reading words as sentences except at early grades, unless we consider that such overt behavior as page turning or finishing a book is in fact sufficiently reinforcing to sustain the process, or if some extrinsic award is awaiting the completion of the reading. While it is true that some derive considerable reinforcement from having finished a book and then reporting to friends or teachers that it has been read, the vast bulk of reading is not for this purpose. While this is an oversimplification of the reinforcement position, it points to the necessity for the postulation of a non-overt reinforcement system to account for the phenomenon of sustained reading. Self-reinforcement is derived from the individual's ability to match the author's language patterns with his own to derive meaning from the printed word and to interpret these meanings in view of his own experiences.

The ability of an individual to derive self-reinforcement from reading material is dependent upon the magnitude of the reinforcing stimulus, which in turn is directly related to the difficulty of the reading material. Where material is too difficult we find that the ability of the individual to self-reinforce is lower than the amount of energy or frustration that he must exert to read. Alternatively, if the material is too easy, the increment of reinforcement is too small and exceeds the extinction ratio. The ability of an individual to reinforce himself while reading material is directly related to his attention to the material and to his reading comprehension.

Given this position, therefore, we can deduce that reading comprehension will be relatively low where the material is difficult for a reader. In turn, as the relative difficulty decreases, reading comprehension will increase. Finally as the material becomes relatively simple, the reading comprehension will not increase proportionally. The area of extreme difficulty in reading comprehension has been explored through the development of the readability scales. The area of supreme simplicity, on the other hand, remains to be explored.

The cloze precedure has a tendency to make reading materials more difficult and as such we should expect responses to the cloze procedure to follow a similar pattern but to give different values at different grade levels. Cloze procedure has still a further advantage in that one can relatively control the amount of difficulty of cloze procedure passages by controlling the syntax of the deleted material. Noun, verb and adjective deletions tend to be more difficult, whereas pronouns, conjunctions and noun determiners as deletions tend to be considerably simpler. Hence cloze procedure offers a flexible tool for investigating the limits of reading comprehension in relation to reading material difficulty.

Use of cloze procedure as a teaching tool, rather than as a testing device, has been explored by Fletcher. (4) As a teaching device, cloze has been found effective for the teaching of reading comprehension to college adults and also to sixth grade pupils. In each case motivational schemes were presented and reinforcement followed the completion of the cloze materials.

The study by Bloomer and Heitzman (1) which found that post-test reading comprehension scores following random cloze material, where the material had been preceded by a pre-test of the same questions as those used for the comprehension, and also where no pretest was given, over straight reading material, led to the suspicion that the completion of cloze blanks themselves might be sufficient for learning or increasing comprehension. The data suggested that one might look to a concept such as self-reinforcement to explain the particular phenomenon which occurred. Self-reinforcement reasoning would go something like this: when an individual completes a cloze clozure which for him makes sense in the particular passage, he is enabled to match this clozure with his already established language pattern and determine its quality. If the match is successful and the individual feels that he has fulfilled the requirements of the cloze blank, he would then be in a position to reinforce himself without the requirement of the additional confirmation which comes from being given a correct answer. One should not necessarily expect that self-reinforcement would be as effective as either immediate overt reinforcement subsequent to making the response or terminal overt reinforcement which would allow the individual to match his total clozure responses against a word list and hence determine his own correct responses.

The present paper therefore reports a series of experiments which relate to the hypothesis of self-reinforcment as it might be found in answering cloze procedure materials.

The first experiment in the series was designed to determine the effects of deletions of specific syntaxes upon the reading compresension of the passage. Paragraphs of six hundred words in length were used. These were adjusted to fifth grade reading level using the Yoakum formula. A passage was given to 342 seventh grade students in a consolidated school in central Connecticut. The questions had been pretested on a similar group of seventh grade pupils and adjusted such that each item discriminated and hence correlated with the total test score. Twelve comprehension questions were asked at a posttest for the reading paragraph. The data indicated that at the seventh grade level the most difficult material, the modifier deletions, produced significantly inferior comprehension to the simplest form, no deletions, whereas the noun determiners, with a raw probability of a correct response of .33 produced significantly superior comprehension to both no deletions and modifier deletions. These data confirm the hypothesis that very easy material, no deletions, is comprehended less well than material of moderate difficulty, noun determiner deletions, and better than material of extreme difficulty, modifier deletions.

This experiment has the flaw in it that the modifier deletions may have reduced significantly the number of ideas available, but this explanation does not affect the superior performance of the noun determiner selections.

To counter this objection, the third experiment was designed primarily to compare boys vs girls at the fifth, seventh, ninth and eleventh grade levels and the long-term recall of cloze procedure materials with deletions of various syntax against straight reading material and random cloze. All cloze materials in the present experiment were ten percent deletions, primarily because it is relatively impossible to use a higher percentage of deletions and at the same time specify the syntax of the deletions.

PROCEDURE

Materials. Twenty-four six-hundred-word passages were prepared. Twelve comprehension questions were prepared for each one. These were pretested and the data analyzed for item discrimination. Adjusted questions or paragraphs were pretested a second time to ensure that the items did discriminate. All selections were adjusted to fifth grade reading level using the Yoakum formula and all the adjustments were made in such a way as not to affect the meaning of the paragraph. Each selection was prepared in seven different forms:

Type 0—Zero deletions
Type 1—10% deletions: Random
Type 2—10% deletions: Nouns
Type 3—10% deletions: Verbs (auxiliary verbs were not included)
Type 4—10% deletions: Adjectives
Type 5—10% deletions: Pronouns and Conjunctions
Type 6—10% deletions: Noun Determiners

The sample for the present experiment consisted of fifth, seventh, ninth and eleventh grade pupils, totaling 1411, from a regional school adjacent to a large city in upstate New York.

Method. Each student was given a package of six of the selections along with the comprehension questions and appropriate answer sheets for answering the cloze material. The envelopes were passed out to the pupil at the beginning of the class period on two nonconsecutive days during three weeks. At the end of each working period the materials were collected from the student and remained with the teachers. The student was instructed to read the selections, to fill in the blanks where appropriate, to answer the questions and to return the material to the teacher. The teacher did not grade the material, reducing the possibility of overt reinforcement. Each student received six selections with the identical deletions type, but within any class deletion types and selections were randomly assigned to students to control for class differences.

RESULTS

Between-Grade-Level Comparisons. Table 1 gives the means and variances for each deletion type at each grade level. Reading comprehension scores for Grade 7 are superior to those for Grade 5 beyond the .01 level of confidence for all comparisons except for Type 2, noun deletions. The difference is not significant, although it is in the expected direction. The tests range from 2.91 for Type 3, verb deletions, to 6.87 for Type 6, noun determiners.

Table 1

Mean Correct Responses to Comprehension Questions By Grade Levels and Type of Responses for All Subjects

		Deletion and Type						
Grade Level	Statistic	0	1	2	3	4	5	6
5th	N	200	184	230	190	108	184	180
	X	5.70	4.82	5.16	5.21	4.56	5.68	5.87
	S^2	5.24	5.65	9.49	5.72	5.34	4.88	4.71
7th	N	189	156	124	109	181	172	160
	X	6.61	6.23	5.28	6.03	5.58	6.88	7.58
	S^2	6.07	5.65	11.38	5.32	6.71	5.49	5.76
9th	N	229	142	127	174	183	177	177
	X	8.19	7.33	6.83	7.07	7.16	7.98	6.84
	S^2	4.74	8.35	7.67	6.68	4.65	5.55	6.59
11th	N	207	177	151	140	141	112	119
	X	8.22	7.02	6.84	7.45	6.87	7.66	7.69
	S^2	4.81	5.74	4.64	8.09	2.86	4.58	3.50

The comparisons between Grades 7 and 9 indicate that six of the comparisons are in the expected direction and significant beyond the .01 level of confidence. The t's range between 4.07 for random deletions to 6.87 for the zero deletion group. The exception to this trend occurs in the noun determiner group where the reading comprehension following noun determiner deletions for Grade 7 is significantly greater than the Grade 9 comprehension for the same deletion type. Grade 7 is significantly superior at the .05 level of confidence: $t = 2.44$.

The Grade 9—Grade 11 comparisons indicate no significant difference between the groups except that Grade 11 is significantly superior to Grade 9 for the noun determiner group, Type 6 ($t = 3.31$). It should also be commented at this point that the noun determiner group was not superior to the Grade 7 noun determiner group. Two possible explanations offer themselves for this phenomenon. The first is that the nith grade reached the upper ceiling of the test and therefore the eleventh grade could not be expected to achieve higher scores. This however appears to be improbable for several reasons. First of all, the mean number of responses made by eleventh graders was less than two-thirds of the number of possible responses. Further, in four of the comparisons the responses made by the ninth graders was superior to the eleventh graders indicating that it is possible to get higher scores, albeit these differences were not significant.

It is important to bear in mind that the material which was presented to the eleventh grade pupils, the same as the other material, was at fifth grade level. Hence its level of difficulty for these pupils would be relatively low. As the level of difficulty becomes extremely simple, the value of making a correct response is lost, and hence the individual is operating at a reduced motivation. The requirement to attend carefully to the material in order to get a correct response is dissipated where the material itself is simple, and hence the strength of a self-reinforcement would be dissipated, along with the attention factor. The quality of the self-reinforcement, therefore, is dependent upon some level of difficulty. This is further substantiated by the fact that the ninth graders, when dealing with the Type 6 noun determiners where the probability of a correct response is .33, did relatively less well than the seventh graders. We can assume that the ninth graders would find this material exceptionally easy and therefore without motivating value which would overcome the amount of energy output required to read the material and answer the close responses. The seventh graders, on the other hand, find this level of difficulty to be highly motivating. This is confirmed not only in the present experiment but also in the preceding pilot studies. These data confirm the hypothesis that it is possible to have comprehension materials which are too simple for a particular group to achieve maximum comprehension.

Type Comparisons. In general, at all grades, Type 2 (noun deletions), Type 5 (adjective deletions), and Type 3 (verb deletions) tend to be inferior to the control group, Type 0, and to Type 1 (random deletions), Type 5 (pronouns and conjunctions) and Type 6 (noun determiners).

Selections containing Type 0, Type 5 and Type 6 also contain the greatest amount of information and present the least difficulty for the students.

Recall of Comprehension Materials. The recall test was comprised of 36 questions. Six of the twelve comprehension questions which followed the selections were randomly selected for the comprehension test. Each student was assigned a form of the test commensurate with the selections which he had read previously. The recall test was given ten weeks following the last of the selections. The means and variances are presented in Table 4. The rank order for recall comprehension indicates that Type 6 (noun determiners) is first, followed by Type 5 (prepositions and conjunctions), Type 2 (nouns), Type 3 (verbs), Type 4 (modifiers), Type 0 (no deletions) and Type 1 (random deletions). Type 5 and Type 6, as well as Type 2, were each found to be significantly superior to the Type 1 random deletions for recall compresension (t.2,1=2.10; t.6,1=2.97; and t.7,1=2.30). No other significant differences were found.

It should be noted here that the Type 5 and the Type 6 were, for all grade levels, typically among the highest scores on the initial comprehension test, whereas Type 2 was quite typically one of the lowest. Furthermore, the Type 0 comprehension exercise material was again among the highest, and on the recall was among the lowest. This raises a question as to the relationship between the immediate learning and the recall of information. Results from learning experiments show that the greater the initial learning, the greater the recall. However, under present experimental conditions each subject was responding to a single exposure. Following the reasoning in the field that recall is related to initial learning, one would expect relatively high correlations between immediate comprehension test scores and recall scores. This proves not to be the case in the present instance. The correlations range from a =.76 to a −.29 with an average determined by z transformation of .20. Further, it would seem highly probable that the number of correct clozures should relate to immediate comprehension test scores. These range from .76 to −.11 with an average determined by z-transformations of Z 20. Further, there appears to be no relationship between the number of correct clozures and the number of recall comprehension questions answered. Correlations here range from a +.56 to a −.92, with an average of —.019. The indication here is clear. Cloze procedure itself seems to be testing something different from the usual type of comprehension question. This result would support other findings such as those by Weaver and Kingston (4) in the same area. Further, initial reading comprehension test scores, whether cloze procedure or not, are testing something different from final recall procedures, which would indicate perhaps that if one is concerned with the long-term remembering of materials, the procedure of paragraph comprehension exercises which we customarily use to teach reading comprehension is not adequate. In essence, the long-term recall of these materials appears to be a quite different skill from the reading comprehension skills which are taught via paragraph comprehension techniques.

Sex Comparisons by Grade. Tables 2 and 3 show the means and variances for boys and girls by grade level. An analysis of variance indicated significant difference between grades but no significant difference between the sexes. The data show that in thirteen instances out of twenty-eight, the boys achieved superior mean scores. This difference

Table 2

Mean Correct Responses to Comprehension Questions
By Grade Levels and Types of Deletions for Boy Subjects

		Deletion and Type						
Grade Level	**Statistic**	**0**	**1**	**2**	**3**	**4**	**5**	**6**
5th	N	136	81	94	96	75	102	121
	X	5.53	4.43	5.09	4.68	4.47	5.85	5.45
	S^2	5.35	4.33	5.44	5.46	5.69	5.99	6.08
7th	N	99	97	65	42	67	99	96
	X	6.80	6.26	4.74	5.64	5.78	6.86	7.20
	S^2	6.76	5.78	18.64	5.80	5.91	6.47	6.87
9th	N	93	98	84	94	64	116	94
	X	8.84	7.91	7.00	7.09	6.77	7.87	6.22
	S^2	3.46	7.71	8.63	5.37	5.40	5.47	6.71
11th	N	111	78	59	66	76	16	43
	X	8.37	6.85	6.71	7.53	6.53	7.81	7.74
	S^2	5.02	4.43	5.17	7.26	6.33	3.07	15.56

Table 3

Mean Correct Responses to Comprehension Questions
By Grade Levels and Types of Deletion for Girls Subjects

		Deletion and Type						
Grade Level	**Statistic**	**0**	**1**	**2**	**3**	**4**	**5**	**6**
5th	N	64	103	136	94	33	82	59
	X	5.97	5.13	5.21	5.74	4.79	5.48	6.42
	S^2	4.13	6.40	4.97	5.53	4.81	4.40	4.98
7th	N	90	59	59	67	114	73	64
	X	6.40	6.20	5.88	6.28	5.46	6.92	8.17
	S^2	5.37	5.66	3.07	5.03	7.17	4.31	3.67
9th	N	136	44	43	80	119	61	83
	X	7.75	6.05	6.53	7.06	7.34	8.18	7.53
	S^2	5.21	7.72	6.07	8.37	4.20	5.82	5.70
11th	N	96	93	92	74	65	96	76
	X	8.05	7.15	6.92	7.39	7.26	7.64	7.66
	S^2	4.60	6.92	7.37	3.44	6.05	5.49	5.43

was significant in two instances. The comparisons between boys and girls at the ninth grade level shows the boys to be significantly superior (Type 0, t=3.98; Type 1, t=3.69). The girls appeared to be superior in fewer instances as the grade level advanced. Fifth grade girls were superior to the boys in three instances; Type 1 (t=2.06); Type 3, verbs (t—3.15); and Type 6, noun determiners (t=2.65). At the seventh grade level girls were significantly superior to boys for Type 2, nouns, and Type 6, noun determiners (t=1.96 and 2.70, respectively). At the ninth grade level the girls were superior to the boys in one instance, noun determiners (t=3.50) and at the eleventh grade level girls were superior to boys in one instance, random cloze (t=4.70). Data suggest that girls, therefore, appear to be more responsive to the noun determiners than do boys, in that in three instances out of four they were significantly superior; and the data also suggest that the difference between boys and girls, which may be present in the early years, seems to disappear as the children get older.

Girls at the seventh and ninth grade levels seem to be better able to reinforce themselves from their language patterns than do boys. A comparison between the grades shows that ninth grade boys are superior to eleventh grade boys in Type 1 (t—2.98) and inferior to eleventh grade boys in Type 6 comprehension (t=2.36). The mean score for boys in Grade 9 is superior to the mean score for boys in Grade 11 in five of the six comparisons. This may be a function of the differential approach to language materials of boys and girls, and indicates as do the other data, the tendency for younger boys to be self-reinforced by correct responses in cloze procedure materials to be somewhat less than that of girls.

DISCUSSION

The data confirmed the hypothesis that essentially higher grade pupils confronted with material of extreme simplicity, approximately six reading levels below their mean ability, could not derive sufficient self-reinforcement from reading the material or completing the cloze exercises to comprehend at a level better than that of the ninth grade.

The sex comparisons indicate that, as the material gets relatively more simple, the differences between the sexes seem to disappear, and the tendency for boys' performance to be superior over girls increases. This suggests testing the hypothesis that teaching boys at lower levels with material which is somewhat simpler may erase the traditional difference between boys and girls in reading ability. Type 0, 5 and 6 materials confirm the hypothesis of self-reinforcement. It remains, however, to determine why the other deletion types do not follow this pattern. The clue to this dilemma is found in the decreased performance of the ninth graders on Type 6 (noun determiners).

The fact that relative comprehension decreases with simple material gives rise to a requirement to examine school materials, particularly at the first grade level, to determine if the simplicity at that level is not debilitating to reading progress.

The data also suggest extreme care with the pre-reading survey techniques. The effect of the pre-reading survey may be to reduce the value of the reading material in the eyes of the individual such that he will not then comprehend the material. Obviously this caution would not hold where the material is new to the reader. However, where the material is familiar pre-reading may cause him to pre-judge and to underestimate the value of the material. Under these conditions survey techniques will reduce rather than increase reading comprehension.

The experiments suggest caution in the interpretation of certain test results. It is common practice in the building of standardized tests to extrapolate the performance of the extremes of the standardization group from data found at the middle of the standardization range. This practice may have the net effect of making completely unreliable scores at the upper extremes of the range. At the upper limits of a standardization group where self-reinforcement is relatively low, reading test scores would be more dependent upon motivation than upon actual reading ability. Working at the extremes of the range for reading tests standardized in the above manner, pretest and post-test differences would tend to be indicated less often than they occur. Further, a standardized comparison of one group with another would not reflect a true index of differences between the groups. Ranking individuals within the class would be more likely to rest on motivational variables rather than upon reading ability. This may account for the fact that many studies of college reading programs have not found significant reading comprehension differences. The data lend credence to the test-makers' admonition that one should select a test where the group to be tested is close to the middle of the range of the scores.

The data also suggest further exploration of the notion that cloze procedure is measuring a comprehension skill which is different from the traditional paragraph-question technique. The highly variable correlations between cloze procedure and reading comprehension indicate that serious exploration may reveal new and useful dimensions for the measurement of reading skills.

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Reactive Inhibition (The Hullman Construct) and Achievement in Reading

Wayne Otto
University of Wisconsin

According to Hullian learning theory, a person accumulates reactive inhibition—which is akin to tissue injury, fatigue or pain—as he performs a given task. (1:137) This amounts to a negative drive that detracts from reaction potential. Thus, Lynn (3) argued that if the theory that early acquisition of basic educational skills is a matter of conditioning (8) is correct, pupils who learn these skills readily should generate reactive inhibition slowly. The data (3, 7) support the prediction for the specific skill area of reading: poor readers dissipate more reactive inhibition during rest than do good readers. The purpose here is to summarize the results of studies designed to investigate the generality of the relationship between reactive inhibition and achievement and to examine factors that may affect inhibitory potential.

An inverted-number printing task was used in all of the studies to quantify reactive inhibition. Subjects printed inverted-numbers from 1 to 10 for 12 massed 30-second trials, rested 5-minutes, and had four more massed trials. The assumption is that reminiscence (the gain in postrest over prerest performance) reflects the amount of reactive inhibition dissipated. Table 1 shows mean numbers printed on first and

Table 1
Mean Numbers Printed on Selected Trials

Main Group	Sub Group	Trial		
		1	2	13
Reading (Negro Ss)	Good	8.8	11.1	14.2
	Poor	8.0	8.5	13.1
Writing	Good	8.6	10.4	13.2
	Poor	8.4	9.2	14.1
Spelling	Good	8.8	10.9	13.2
	Poor	8.8	9.8	13.7
Arithmetic	Good	12.0	14.6	19.8
	Poor	9.6	10.3	14.9
Spelling	Good (Hi)	12.2	13.5	18.9
	Poor (Lo)	8.3	9.9	13.8
Reading	Good (Lo)	8.3	10.9	13.5
	Poor (Hi)	7.4	8.9	13.1
Low Motivation	Hi Anx	8.0	10.0	12.6
	Lo Anx	7.5	9.4	11.9
High Motivation	Hi Anx	7.8	7.7	13.9
	Lo Anx	9.0	9.8	14.2

last prerest and first postrest trials by all groups considered here. Note the sharp postrest gains in performance. Reference is made in the discussion to results of comparisons of acquisition (prerest) and reminiscence gains; the comparisons were made by repeated measures analyses of variance, specifics of which are given in the original reports.

A study of 60 Negro subjects in grades 4, 5, and 6 replicated results obtained with all white subjects; (6) that is, analyses of good and poor readers' performance on reminiscence traials (Trials 12 and 13) revealed a Trial X Achievement Level interaction, which demonstrated the statistical significance ($p<.05$) of poor readers' greater gains (see Table 1). Thus, poor readers dissipated more reactive inhibition during rest than did good readers. Furthermore, good and poor readers did not differ on Trial 1, but by Trial 12 good readers were producing more inverted numbers; and analyses revealed a significant Trial X Achievement Level interaction. The interpretation was that poor readers' performance was depressed by rapidly accumulating reactive inhibition, which was dissipated during rest. The data thereby supported the previously untested assumption that poor readers accumulate reactive inhibition more rapidly than do good readers. The previous studies considered here had shown greater dissipation only. The study demonstrates the generality of the relationship of reading achievement and reactive inhibition with Negro pupils and a white examiner. The latter seems particularly significant in view of factors—recently reviewed by Katz (2)—that may influence Negroes' test performance; that is, a number of variables might have acted to invalidate the inverted-number printing task as a measure of reactive inhibition.

The relationship between inhibitory potential and skill attainment in the basic skill areas of arithmetic, handwriting, and spelling was examined in another study. (5) Subjects were 220 good and poor achievers in the several skill areas from grade four through eight. The predicted relationship was demonstrated for handwriting and spelling: the poor achievers dissipated more reactive inhibition during rest than did the good achievers. But the relationship did not hold for arithmetic: the good achievers produced many more digits than the poor achievers (see Table 1) and they did not differ from poor achievers in reactive inhibition dissipated during rest.

In a Hullian framework, increased motivation should cause both increased performance and—because there is less resting while working and, therefore, less spontaneous dissipation of reactive inhibition—greater accumulation of reactive inhibition. The validity of such a prediction was supported by the results of an earlier study by Wasserman (10). Thus, there was support for speculation that the performance of good achievers in arithmetic may have been due to inherent motivation to do well on a success associated task like number-printing. If this is in fact true, then high extrinsic motivation should produce similar results with good achievers in other skill areas. Furthermore, the related expectation would be that increased motivation would worsen poor achievers' already present tendency to accumulate reactive inhibition rapidly. Another study (5), reported in the same article as the study just described, was designed to test these notions.

In the first phase of the study, 60 good and poor spellers in grades four through six served as subjects. Procedures of the earlier studies were replicated, except that good spellers were given instructions intended to be highly motivating. Whereas the original instructions were designed merely to secure cooperation without anxiety, the revised instructions were designed to produce ego involvement in the inverted-number printing task and, presumably, higher motivation. With the revised instructions good spellers' performance was similar to that of good achievers in arithmetic. In fact, they not only produced more digits, but they also dissipated significantly more reactive inhibition than the poor spellers, which was in complete accord with the prediction. In the second phase, 60 good and poor readers in Grades Four through Six were subjects, but the poor readers got the revised instructions. Here the results did not support the prediction. The ostensibly highly motivated poor readers produced no more inverted-numbers than the good readers although they did, as before, dissipate more reactive inhibition during rest. The revised instructions, then, had no clear effect upon poor readers' performance. Whether highly motivated poor achievers simply cannot produce more digits or whether motivating instructions have no effect or even a debilitating effect upon poor achievers' performance is not clear from the data. The possibility that motivating instructions may have differential effects upon the performance of good and poor achievers is intriguing. Studies like one recently reported by Van De Riet (9), where the suggestion was that good and poor achievers respond differently to praise and reproof, lend some support to such a notion.

A final study (4) examined the relationship between subjects' anxiety level and inhibitory potential. Equating anxiety to drive, the prediction is that high anxiety subjects will produce more work and accumulate more reactive inhibition than low anxiety subjects in a given period of time. One main purpose of the study was to test the validity of the prediction. A second purpose was to examine the effect of different levels of motivation. The notion was that different motivation levels might produce different results with high and low anxiety subjects, just as with good and poor achievers. The Children's Manifest Anxiety Scale was used to identify 120 pupils in grades four through six who scored high (top 20%) or low (bottom 20%) on the scale. Equal numbers of subjects were given instructions intended to evoke high or low motivation. Performances of high and low anxious subjects with high motivation and high and low anxious subjects with low motivation were compared by analyses of variance. The expectation was only partially confirmed. With high motivation, high anxiety subjects accumulated more reactive inhibition than low anxiety subjects; but with low motivation high and low anxiety groups did not differ. The suggestion was that anxiety level may become a relevant factor only after a critical level of motivation has been reached. Support is thereby implied for further speculation regarding the possible differential effects of motivation level upon the performance of good and poor achievers.

To sum up, a relationship between reactive inhibition and attainment in reading, spelling, and handwriting has been demonstrated. Given a fairly low level of motivation, poor achievers appear to accumulate reactive inhibition more rapidly than good achievers. There is evidence that good achievers' performance and tendency to accumulate reactive inhibition increase when motivation is increased; but no such relationship has been demonstrated with poor achievers. The role of anxiety level in producing such results is not yet clear; but it does seem clear that both anxiety and motivation levels ought to be considered in making predictions regarding inhibitory potential for the time being. The fact remains, however, that what we have rather arbitrarily termed anxiety and motivation are, in the present framework, aspects of total drive. Ultimately we should seek clarification of the nature, role and interaction of these and other aspects of drive and their effect on inhibitory potential.

It seems reasonable to hypothesize a casual relationship between the tendency to accumulate much reactive inhibition and poor achievement—at least in certain skills—despite the fact that Hull's notion of conditioned inhibition has fallen into disrepute. Inefficient learning precipitated by too rapid accumulation of reactive inhibition could account for lack of early skill mastery and resultant chronic underachievement without dependence upon the construct of conditioned inhibition. That underachievers respond to remedial teaching bespeaks the fact that their disability is not permanent. Studies that manipulate distribution of practice should help to clarify the role, if any, of reactive inhibition as a cause for learning problems.

Even the most optimistic believer in the relationships discussed here would not suggest at this point that a tendency toward rapid accumulation of reactive inhibition is a major--or even secondary, for that matter—cause of reading disability. Perhaps performance that is here interpreted as evidence of rapid accumulation of reactive inhibition and poor performance in reading share a common underlying cause. One might argue, for example, that a poor readers' repeated failures lead him to withdraw more quickly from sustained academic-type work, despite reasonable initial effort. Nevertheless, the investigation of inhibitory potential and achievement give rise to some provocative questions. Answers to provocative questions are always worth seeking, regardless of where they may lead.

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Improving Grade Point Averages Through Reading—Study Skills Instruction

Lawrence E. Hafner
University of Georgia

INTRODUCTION

Background of the Problem. The grade point average is important. Some students might consider it a mundane problem. However, if one wants to stay in college to continue his studies formally, he must maintain a "C" average in most colleges. For many students maintaining a "C" average is a formidable task.

The abilities to comprehend written material well and to organize ideas effectively are key skills in academic work. Reading is involved in ninety per cent of college work, yet twenty-five per cent of college freshmen cannot read well enough to succeed in college.

Why are there so many ineffective readers in college? Apparently, such factors as social promotions in high school, limitations of intelligence, and lack of instruction in reading-study skills combine to provide colleges with poor readers and readers, regardless of intellectual ability, who are not reading commensurate with their ability.

Many colleges have reading improvement programs. These programs purport to be effective. Their effectiveness is often measured in terms of their ability to improve reading ability. However, the correlation between reading achievement and academic achievement is much less than perfect. Neither can a person who is put on academic probation flash a high score in reading in hopes of being allowed to stay in school. He must give evidence of satisfactory academic achievement; he must produce an adequate grade point average. Can a reading-study skills course help students improve their grade point average?

Statement of the Problem. The basic purpose of this study is to determine the effect of reading-study skills instruction on the grade point averages of students at Southern Illinois University.

Related Literature. Only a few representative studies related to the stated problems will be reported. Two comparatively short-term reading programs failed to yield desired results. Reed (19:263) found that short-term training in reading, twenty-seven one-hour periods over a period of nine weeks, did not yield changes in honor point averages of freshmen enrolled in a nurses training program. In Sternitzke's (2D:2856, 2857) study freshmen enrolled in an eighteen-meeting, voluntary reading and study methods program were the experimental group. One year after the reading improvement program was completed, experimental and control subjects did not show a significant difference in grade point averages. McDonald's (14:178) study compared university students enrolled in a reading improvement program with a control group. A significantly greater number of the *control* group than the experimental group earned grade point averages *below* a criterion number in two subsequent terms.

One study is cited to show that above-average test scores in reading can be an advantage to the student. Breen (3:484) found that "students with test scores below the means of three reading tests had about a fifty-fifty chance of obtaining an all-university average of 2.00. Those above the means had about a three to one chance.. Kingston and George (48:471) concluded that "a college reading program may assist students to achieve more satisfactory academic achievement when their curriculum is largely linguistic in nature."

Personality factors are associated with reading achievement and academic achievement. Joseph and McDonald (10:155) found that university freshmen who read well show greater need to achieve and a need for change and affiliation as determined by the *Edwards Personal Preference Schedule*. Students who read poorly also possess greater aggression, order, and abasement needs. Woolf (22:78, 79) found anxiety and below average ego strength to be linked with reading disability. Anxiety shows itself in worry, inability to concentrate, and lack of self-confidence. A lack of ego strength manifests itself in intellectual inefficiency, narrow interests, lack of confidence, and reduced energy level.

A study by H. Alpert (1:2093) of seventy-one females and thirty males enrolled in the University of Florida revealed that (1) "empathy is not related to reading ability in literary or non-literary materials" as measured by scores on reading tests; (2) "degree of projection is not related to reading comprehension in literary or non-literary materials" for the total sample or for the males in the sample; (3) female readers who project, i.e., become emotionally involved, in a literary passage or "with characters in a passage read with a higher level of comprehension than those who maintain a detached, objective attitude;" (4) subjects who project their own feelings and attitudes the least read with a higher level of comprehension in non-literary or factual materials than subjects who project the most. The study by Kim (13:150) indicated that "such non-intellectual factors as study habits, motivation, and personality as well as academic aptitude appear to play significant roles in determining college grades." R. Alpert (2:643) studied general anxiety scales and specific anxiety scales as predictors of academic performance. (The latter scales have items specific to the academic testing situation.) He found the specific anxiety scales to be better predictors of academic performance than the general anxiety scales. Hafner (6:143) found that anxiety and extroversion, as measured by Cattell's VF *P-F Questionnaire,* are associated with poorer grade point achievement of college seniors.

Modification of attitudes through counseling and therapy has salutary effects. De Weese's (4:3192) study seemed to indicate that both counseling and remedial reading instruction are effective in improving the grade point averages of college freshmen. McDonald and Zolik (15:97) found that "group psychotherapy contributes significantly to a college reading improvement program."

Two studies are cited to prove the necessity for reading instruction in college to improve reading skills. A generalization derived from Breen's study (3:484) was that students who are doing poorly in a given reading skill should receive training in that skill. Kingston and George (12:474) discovered that unless students receive special training designed to develop reading comprehension, they make inconsequential gains or no gains in that skill between their freshman and junior years.

Holmes' (8:78) study provided information on the power of reading. At the college level, power of reading depends upon a cluster of these high level abilities which are basically of the same order of importance: "Integration of Dispersed Ideas, Interpretation of the Paragraph, Noting the Clearly Stated Details, and Drawing Valid Inferences beyond the actual material presented." Holmes (8:79) also issued a note of warning about the relationship of power and speed in reading: ". . . though the general rule is for thé powerful readers also to be the faster readers, many individuals in college may be slow but powerful readers, or again, non-powerful but fast readers."

One representative study showed the value of a college reading program in combating the dropout rate. The investigation by McDonald (14:179) of the influence of a college reading program showed that the dropout rate of his experimental group was markedly lower than that of the class from which it was drawn.

Deficient reading is associated with being on probationary status. Hill (7:91) studied adequate and deficient readers among college freshmen and found that significantly fewer adequate readers than deficient readers were on probationary status or had withdrawn from school after one semester of college work.

The following two studies provide a method for predicting success in college and a rationale for equating experimental and control groups on the basis of grade point average. Palacios (18:2679-80) used seventeen predictor variables in his attempt to discover efficient predictors of grade point average. The best single predictor of academic success was past achievement as measured by the first year grade point average. Munro (17:1179) found high school grade point average to be the best predictor of college grades, whereas reading comprehension and reading vocabulary were the second and third best predictors.

Women may be more efficient students than men. In a study of entering freshmen at Michigan State College, Jackson (9:301) found that "women tend to perform more nearly in accord with their measured ability than do the men."

Two representative studies are quoted to show that delving into the literature can yield methodological tips for the teacher. Wooster (23:2067) studied F. P. Robinson's SQ3R study method and discovered that in teaching the SQ3R method, which "can be helpful to students," the "total method should be considered briefly with a class, then attention should be turned to its component parts. This approach would take advantage of the expectancy that the students may be better able to learn by the means of the part method, and it would give the students the opportunity to learn the prerequisite skills which they seem not to have." Fonsworth (5:2027) compared the effectiveness of a reflective-thinking approach in teaching high school chemistry with procedures that emphasize the learning of facts and principles. The reflective thinking group made greater gains on those tests concerned with thinking abilities. Factually-taught students did better on a factual-information chemistry test. "However, the differences in gains in the ability of the reflective-thinking groups to do reflective thinking were much larger than the differences in gains in the ability of the factual information groups to acquire a knowledge of facts and principles."

Many studies have been done on the relation of reading rate to reading comprehension. Stroud (21:84) has quoted a study by Thalberg that has many implications, one of which is to remind one that many variables enter into any discussion of rate and comprehension. Thalberg "obtained correlations of zero, more or less, between rate of reading established on one set of selections and comprehension scores established on entirely different sets of selections."

THE STUDY

Amplification of the Problem. This study seeks specifically to answer the following questions:

1. What is the effect of reading-study skills instruction on the grade point averages of college students?
2. What is the effect of a lack of reading-study skills instruction on the grade point averages of college students?
3. Does a statistically significant larger number of experimental students than control students obtain a grade point average above a criterion number, 3.0 or "C," in the quarter following the reading-study skills instruction?
4. How do students who profit greatly from reading-study skills instruction differ from those who do not profit from such instruction?

5. Does instruction in the reading-study skills result in improved reading scores?

DEFINITION OF TERMS:

1. Low ego strength: 16 P-F variable "loaded" with these traits: lacking in frustration tolerance, changeable (in attitudes); showing general emotionality; evasive (on awkward issues and in facing personal decisions); neurotically fatigued; worrying.
2. High ego strength: 16 P-F variable "loaded" with these traits: emotionally mature; emotionally stable; calm, phlegmatic; realistic about life; absence of neurotic fatigue; placid.
3. Suspecting, jealous: 16 P-F variable "loaded" with these traits: jealous; self-sufficient; suspicious; withdrawn, brooding; tyrannical; hard; irritable.
4. Trustful, adaptable: 16 P-F variable "loaded" with these traits: accepting; outgoing; trustful; open, ready to take a chance; understanding and permissive, tolerant; soft-hearted; composed and cheerful.
5. Self-sufficient: 16 P-F variable. People of this type are accustomed to making decisions alone; in group dynamics they are more dissatisfied with group integration and they make remarks which more often are solutions rather than questions; they tend to be rejected.
6. Dependent, imitative: 16 P-F variable. People of this type go with the group, value social approval, and are conventional and fashionable.
7. Introversion: 16 P-F factor related to schizothymia.

Procedure, Subjects, and Materials: Thirty-five students enrolled in section two of the reading-study skills course at Southern Illinois University were the experimental group. Thirty-five students not enrolled in a reading-study skills course were the control group. The subjects were matched for initial grade point average and year in school. In addition to the comparison of the experimental and control groups, several types of achievement among the experimental group were studied:

1. Experimental students who made good academic gains (termed "effective" students) were compared on certain personality factors measured by the 16 P-F test with students who made poor gains (termed "ineffective" students) and students who failed to meet course requirements.
2. Experimental students who made good academic gains (.955 mean gain in grade point) in the quarter following the quarter in which they were enrolled in the reading improvement course were compared on certain achievement and interest variables

with experimental students who made no gain (−.054 mean gain in grade point) during that quarter.

The *Nelson-Denny Reading Test,* Forms A and B, and the *Cooperative Reading Test,* Forms 1A and 1B, were used in different quarters to obtain a measure of reading ability of the experimental students. The Cattell *Sixteen Personality-Factor Questionnaire* was used to obtain information on personality variables. The *College Students and Reading Questionnaire* by Lawrence E. Hafner and Olive Kirsch was used to explore facets of student background and interests. Grade point averages were obtained from official reports in the registrar's office.

The following kinds of materials were used in the experimental program reported in this study: (skills emphasized are in parentheses)

1. Texts used in the freshmen program (comprehension, vocabulary, outlining, SQ3R, summarizing, reading preface, using the index).
2. The students' own textbooks (same as in 1).
3. Cloze exercises (reasoning).
4. Teacher-made exercises (vocabulary, sentence comprehension, and paragraph comprehension).
5. Newspapers (skimming, headline reading, critical reading, vocabulary, and concept study).
6. Various easier materials for use with the reading accelerators (rate flexibility) (use of the accelerators was optional).

NOTE: This year the reading improvement program has expanded into multiple sections. We are now using *Power in Reading Skills* by Hill and Eller as a basic text. Other college reading improvement books by Spache and Berg; McDonald and Zimny; J. Sherbourne; Miller; F. P. Robinson; and James Brown are available. Two of the S.R.A. reading laboratories are also being used. These books were *not* in use during the experimental quarters).

Purpose, Scope, and Length of Program. The reading-study skills course was designed to help college students improve their grade point average and their ability to read college texts and other materials.

The following reading-study skills were taught:

1. Adjusting reading rates and approaches to reading purposes.
2. Comprehending and interpreting ideas.
3. Organization and retention of material
   a. Making notes
   b. Making outlines
   c. Writing summaries
   d. Paraphrasing and condensing material
   e. Using SQ3R method
4. Selection and evaluation of material.

5. Reading creatively.
6. Reading critically.
7. Reading for appreciation and personal growth.
8. Improving one's vocabulary.
9. Using prefaces, indexes.
10. Preparing comprehensive study questions.
11. Writing the essay examination.
12. Interpreting maps, tables, and graphs.
13. Using reference aids.
14. Setting purposes for reading.
15. Unlocking difficult words.

The classes met for fifty-minute periods four times per week for a period of approximately eleven weeks. All experimental sections were taught by the writer over a period of several quarters.

RESULTS

Presentation and Analysis of Evidence. Question 1: What is the effect of reading-study skills instruction on the grade point averages of college students? Table I shows the gains and statistical significance of the gains by the experimental group. In neither quarter did the experimental group make a statistically significant gain in grade point. However, the group as a whole did score above the magic mark of 3.0 on the post test.

Question 2: what is the effect of a lack of reading-study skills instruction on the grade point averages of college students? Table I shows the gains and statistical significance of the gains by the control group. Neither the very slight gain during the experimental quarter nor the slight loss during the following quarter were statistically significant. Although beginning averages were nearly identical, after one quarter the experimental groups' grade point average exceeded the controls' by .555 points.

Table I

COMPARISON OF PRE-EXPERIMENT CUMULATIVE GRADE POINT AVERAGE WITH GRADE POINT EARNED DURING EXPERIMENTAL QUARTER AND ONE QUARTER AFTERWARD

Experimental	Pre-Experimental	2.969			
	During	3.157	.188	.23	N.S.
	One Quarter After	3.386	.417	.57	N.S.
Control	Pre-Experimental	2.951			
	During	2.983	.032	.05	N.S.
	One Quarter After	2.831	.120	.17	N.S.

Question 3: Does a statistically significant larger number of experimental students than control students obtain a grade point average above a criterion number, 3.0 or "C," in the quarter following the

reading-study skills instruction? Table II shows that a statistically significant larger number of experimental students than control students scored above 3.0 in the quarter following the reading-study skills instruction.

Table II

COMPARISON OF EXPERIMENTAL GROUP VERSUS CONTROL GROUP ON THE FACTOR HIGHEST NUMBER SCORING A GRADE POINT ABOVE A CRITERION NUMBER ONE QUARTER FOLLOWING THE EXPERIMENTAL PERIOD

Factor	Groups Compared	Highest Number Scoring Above a Criterion Number	X^2	Probability of Obtained X^2 Occurring by Chance	Significant at .05 Level
Average Grade Point Achievement					
	Experimental vs. Control	Experimental	4.7	$.02<p<.05$	Yes

Question 4: How do students who profit greatly from reading-study skills instruction in the quarter following instruction differ from those who do not profit from such instruction? Table III shows the results

Table III

COMPARISONS OF CERTAIN INTEREST AND ACHIEVEMENT VARIABLES OF STUDENTS WHO PROFIT GREATLY (HIGH GAINERS), AFTER ONE QUARTER, FROM READING-STUDY SKILLS INSTRUCTION WITH THOSE WHO DO NOT PROFIT FROM SUCH INSTRUCTION

Variable	Highest Number or Score	X_c^2	Probability of Obtained X_c^2 Occurring by chance	Comment
1. Like to read vs. indifferent to reading	High Gainers	14.05*	$p=<.01$	Highly Significant
2. Read essays vs. don't read essays	High Gainers	3.23	$.05< p<.10$	Worth Further Investigation
3. Favorite subject: Science vs. non-science	High Gainers	4.90	$.02< p<.05$	Significant
4. Vocabulary gain vs. no vocabulary gain	High Gainers	1.50	$.20< p<.30$	Worth Further Investigation
5. Likes to read science books vs. don't like to read science books	High Gainers	2.21	$.10 \ p<.20$	Worth Further Investigation
6. Does most reading: male parent vs. non-male parent	High Gainers	2.13	$.10< p<.20$	Worth Further Investigation

*Due to multiple opportunities to respond on this item, cell entries were large and Yates's correction was not needed.

of responses to questions on the *College Students and Reading Questionnaire* that lent themselves to dichotomizing and that yielded significant or nearly significant results. Students who profit from instruction (high gainers) definitely like reading better than no gainers and they like science subjects better than no gainers. High gainers also tend to read essays, make vocabulary gains, and like to read science books more than no gainers. Finally, there is a greater tendency among the high gainers than among the no gainers for the father to read more than the mother.

The personality factors reported in Table IV were measured by the Cattell VF *Personality Factor Questionnaire*. The results in Table IV should be considered exploratory because this instrument was not administered each quarter and the N is small. The finding regarding low ego strength and ineffective gains is reminiscent of Woolf's (22:78, 79) findings with poor readers. The finding linking the suspecting personality and ineffective gains complements the findings by Hafner (6:142) thatt here is a negative correlation between the factor Suspicious, Jealous on Cattell's VF *P-F* test and college grade point. The Self-Sufficient personalities do not appear to make effective gains during the experimental quarter. Perhaps they do not want help. Further research is necessary.

Table IV

COMPARISONS ON SEVERAL PERSONALITY VARIABLES OF STUDENTS WHO SHOW EFFECTIVE GAINS IN GRADE POINT DURING THE EXPERIMENTAL QUARTER WITH THOSE WHO SHOW INEFFECTIVE GAINS

	X^2_c		Comment
Low Ego Strength and Ineffective Gains High Ego Strength and Effective Gains	1.41	$.20 < p < .30$	Investigate further
Introversion Tendencies and Ineffective Gains Extraversion Tendencies and Effective Gains	1.87	$.10 < p < .20$	Investigate further
Self Sufficient and Ineffective Gains Dependent /Imitative and Effective Gains	1.87	$.10 < p < .20$	Investigate further
Suspecting and Ineffective Gains Trustful, Adaptable and Effective Gains	1.51	$.20 < p < .30$	Investigate further

Question 5: Does instruction in the reading-study skills result in improved reading scores? The residual gains in mean vocabulary scores in mean comprehension were so slight as to be insignificant.

SUMMARY OF RESULTS

1. Mean gain in grade point for the experimental group during the experimental quarter was .188.
2. Mean gain in grade point for the experimental group during the first quarter after the experimental quarter was .417.

3. The positive gains in grade point for the experimental group were not statistically significant.
4. The mean grade point for the experimental group exceeded by .555 points the mean grade point of the control group in the first quarter following the experimental period.
5. A statistically significant ($p<.05$) larger number of experimental students than control students obtained a grade point average above 3.0 or "C" in the quarter following the reading study skills instruction.
6. Students who profit greatly in terms of grade point gain the quarter after instruction in reading-study skills have a significantly greater ($p<.01$) liking for reading than those students who do not profit from such instruction.
7. Students who profit greatly in terms of grade point gain the quarter after instruction in reading-study skills have a significantly greater ($p<.05$) liking for science (including mathematics) subjects than those students who do not profit from such instruction.
8. Findings of the present study tend to corroborate the findings of other investigators regarding the relationship between low ego strength and academic difficulty and between the trait of suspicion and academic difficulty. Further investigation is necessary.
9. The relationship between introversion tendencies and ineffective gains in grade point and between self-sufficiency and ineffective gains approached statistical significance.
10. The secondary goal of general improvement of reading scores was not reached.
11. Several areas related to the ability to profit from reading-study skills instruction have been found to warrant further investigation: easy reading, vocabulary gain, liking to read science books.

CONCLUSIONS

1. A student's completing the reading-study skills course increases the probability that he will score above 3.0 grade point.
2. Students who indicated that science is their favorite subject profit greatly from taking the reading-study skills course.
3. Students who have problems of low ego strength may experience difficulty in academic endeavors.
4. The primary goal of improvement of grade point average means that students can be helped to keep their grade point average above the magic mark.
5. Experimentation with new patterns of instruction in the reading-study skills course must continue.

RECOMMENDATIONS

The following recommendations are based on the findings of this study and on the studies quoted in the survey of representative literature:

1. Beginning college students should be screened for psychological problems with a reputable personality inventory such as the Cattell VF *P-F Questionnaire*, the *Edwards Personal Preference Schedule*, or the *Minnesota Personality Inventory*.
2. Counseling or psychotherapy prior to or concurrent with reading-study skills instruction should be made available to students who might profit from it.
3. Further research should be undertaken to assess more accurately who can profit from reading-study skills instruction (a) without counseling or psychotherapy (b) with counseling or psychotherapy.
4. Various approaches to teaching the reading-study skills should be studied experimentally in the multiple sections now available.
5. Academic loads to certain students should be adjusted realistically to their psychological and intellectual capacities until these students can be helped to marshal their capacities effectively.
6. Some of the reading-study problems encountered in college should be obviated by reading-study skills instruction at the high school level.
7. The colleges should bring pressure to bear on the secondary schools and the state department of public instruction to require prospective high school teachers to take courses in teaching the reading-study skills.

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Educational Characteristics of Adult Illiterates: A Preliminary Report

Don A. Brown

State University of New York at Buffalo

There are large numbers of illiterate adults in the city core areas of metropolitan centers such as New York City, Buffalo, Cleveland, Detroit, Chicago, and Los Angeles. The numbers are astounding. In Buffalo alone there are estimated to be over 72,000 functionally illiterate adults, and the number in other cities is proportionate.

We know some things about these people. We know that the vast majority of them are Negro. In November, 1963, Frances Keppel (8) of the United States Office of Education pointed out that nearly four times as many Negroes as whites are effectively illiterate.

We know that many of these illiterates are dependent on the Welfare Department for support, and have little hope of obtaining permanent employment with their limited skills.

We know that the problem of these illiterate adults will not yield to ordinary efforts. The number of functionally illiterate adults was decreased only 100,000 a year from 1950 to 1960, leaving us with 23,000,000 people (8) who do not have sufficient reading skill to function with even minimal effectiveness in our society.

But there are many things about these people we do not know. For the first time, major action is being taken to educate these people; and there are some basic problems. Three such problems, which could not be more basic, are 1) we do not know enough about these people to plan the most effective means and methods of instruction, 2) we do not know enough about these people to prepare effective material for their instruction, and 3) we do not know enough about these people to be able to test them effectively to predict their degree of success in learning, so that we may group them for instruction.

In our haste to provide materials of instruction, both authors and publishers have produced materials based on their knowledge of instruction for children. There was too little forewarning of the need for these materials to permit the development of tests and instructional materials preceded by and based on adequate research into the educational characteristics of these disadvantaged adults, and the previous research falls far short of our needs. There is virtually no research into the pertinent experiential background of the city core adult illiterate. We have not known what things they might be expected to have in their homes, the things with which they might be familiar, what basic

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knowledges they might have, or where they "contact their environment." Without knowledge of these and other pertinent characteristics, educational programs will be less effective than they should be.

STATEMENT OF THE PROBLEM

This paper is a preliminary report on some of the findings of a study currently under way in Buffalo, New York. The purpose of the study is to investigate the educational characteristics of adult illiterates presently attending basic education classes provided by the Adult Education Division of the Buffalo City Schools. Although the completed investigation will have a much larger sample, will include the development of a predictive instrument, and will investigate certain instructional techniques, still, enough information has already been gathered to provide some interesting indications concerning these people.

RELATED RESEARCH

The adult illiterate population in city core areas is overwhelmingly Negro. There is a lack of research related directly to the educational characteristics of adult illiterates in general, and an even greater lack relating to the adult Negro illiterate. The *Harvard Educational Review* (9) published an inclusive analysis of the changes in and status of Negro education in this country. Yet nowhere in this authoritative volume did the problems of the adult Negro illiterate in the metropolitan urban centers throughout the United States find discussion.

Extensive review of the literature only serves to reinforce the point that there has been insufficient research to provide the information neded to intelligently plan programs of improved education.

The need for such information is indicated by the United States Commissioner of Education, Frances Keppel (8) who pointed out in November of 1963 that "23,000,000 Americans 18 years and older have completed less than eight years of schooling." A 1959 census showed that 7.5 percent of Negro adults in the United States are illiterate. This, when compared to a 1.6 percent illiteracy rate for native-born whites, indicates a ratio of Negro illiterates that is much larger than its white counterpart. Caliver (1) indicated that in 1959 the comparison of white to non-white functionally illiterate adults 25 years and older showed that while 4.6 percent of the white group could be classified as functional illiterates, 23.5 percent of the non-whites could be similarly classified.

Corollary to the findings of lower levels of completed education for the Negro is Gray's (5:31) observation that those who leave school before the fifth grade tend, as adults, to read below the expected grade level; on the other hand, those who continue in school beyond the fifth grade, tend to read above the level of the last school grade attended.

The need for attention to the problem is further noted by Robert Luke (7:51), Director of the Division of Adult Education Service of the N.E.A. "He is the last to be hired and the first to be fired. He must contend daily with the problems of which educated people are never aware. Because his skills and personal resources are limited, the illiterate and undereducated person has little to solve his problems by self-help."

The problem is not presently yielding to ordinary efforts. Although the new programs in adult literacy will hopefully change the picture, the number of functionally illiterate adults twenty-five years old or more declined at the rate of only 100,000 a year between 1950 and 1960. This rate of decrease would indicate the presence of millions of illiterates of working age in the population for decades.

Although research on adult Negro illiterates is lacking, there have been some studies of interest and probable application with children. Havighurst (6:210-217) described the socially disadvantaged in terms of family characteristics and personal characteristics. The family characteristics involve the use of a restricted language pattern, restricted family environment, and an unstable family group with either parent missing. Havighurst's personal characteristics are based on research by Martin Deutsch who found that children in the socially deprived family mentioned above have inferior auditory discrimination, inferior visual discrimination, inferior judgment concerning time, number, or other basic concepts. Deutsch found that this inferiority was not due to physical defects of the eyes, or mind, but to inferior habits of hearing, seeing, and thinking. Havighurst continues the discussion by stating that presumably the family environment did not teach them to "pay attention" to what was being said to them, or shown to them.

The point being made is essentially simple. If the culturally disadvantaged Negro child comes to school ill-equipped to listen and see, it is unlikely that the adult Negro illiterate from similar surroundings possesses these abilities to any great degree. If he does not possess them, this has important implications for both testing him and, most important, for the manner of teaching him.

According to Valien (12:331) there has been a constant trend toward the urbanization of the Negro population, and in 1960, the census recorded for the first time that Negroes were more urban than the white population. Eleven of the 25 largest cities have Negro populations of 200,000 or more. Furthermore, most Negro residents of large cities live in the central city rather than in the urban fringe or suburban areas. Deutsch (3:235) describes this city core as "crowded and dilapidated tenements, likely to be extremely crowded apartments, high rates of unemployment, chronic lack of economic security, a disproportionate number of broken families, and in the case of the Negro, continual exposure to demigration and social ostracism. The educational level of the adults tends to be quite limited. The conditions of social inequality, the absence of accessible opportunity structure and the frequent non-availability of successful adult male models create an atmosphere that is just not facilitating to individual development." Deutsch continues by pointing out that there is an amazingly large segment of our population living in a subsociety of social, economic, and educational impoverishment which apparently predisposes to scholastic retardation. This deprivation tends to rob the organism of normal sensory development, and prevents the development of efficient strategies for evaluating information. The implications for education are evident.

So far, the literature reviewed has dealt with the meager information available about the effects of disadvantaged conditions on the undereducated. Witty (15:401-404) reported on the U. S. Army Special Training Units during World War II. The data suggest that the Negro might attain the educational level of the white group of comparable background if given appropriate educational opportunity and motivation.

Caliver (1:33) cites evidence that a fair proportion of non-institutionalized illiterates are educable. He refers to Thorndike's study of *Adult Learning*, Goldberg's study on *Army Training of Illiterates in World War II*, and Norris' study regarding mental deficiency and the adult worker as evidence.

There were very few reports and research studies of adult reading improvement prior to 1945. Goldberg's (4) report stimulated a modest amount of interest and there have been increased reports since that time.

O'Brien and Simkin (10) surveyed the literature in the field of adult reading and found four main types: 1) why adults are not reading as widely and deeply as they should be, 2) descriptions of reading programs in action, 3) self-help guides for reading improvement, and 4) training of the adult illiterate. This latter field has been shown little attention in comparison to the rest of the field of reading. A study of the bibliography presented by O'Brien and Simkin shows that there has been insufficient discrimination between articles specifically pertinent to adult literacy, and articles or texts which are of a general reading nature. Specific writings related to the remediation of adult illiteracy are noticeably lacking. Two exceptions are Smith's *Teaching Reading to Adults*, and Cortwright's article listed in the *Journal of Developmental Reading*, winter, 1959.

Gray prepared a manual on techniques for the education of the illiterate adult which was revised by Whipple, Guylon, and Morriss (14). It provides some apparently worthwhile procedures for working with adults. The procedures are not noticeably different for the most part than present day language experience approaches to beginning reading instruction for children.

Goldberg (4) describes the methods and materials used for the adult illiterates during the Second World War. The program was geared to move quite rapidly, with distinctly different learning situations than for the present urban programs for disadvantaged illiterates.

In short, the research into potential for learning to read, into background experiences on which to base materials and techniques, and investigation of effective methods of instruction in learning to read are virtually non-existent for the adult Negro illiterate.

THE STUDY

The investigation is being conducted in the Adult Basic Education classes of the Buffalo City Schools. The necessity to learn as much as possible about the education of adult illiterates was pointed up by the impending addition of classes in basic education by funds obtained through the Economic Opportunity Act. It was felt that descriptive information was necessary to the improvement of instruction and to the construction of measures for predicting reading growth.

DEFINITION OF TERMS:

Illiteracy is a term variously defined from inability to read or write one's own name to inability to read anything more difficult than fifth or sixth grade reading material. For the purposes of this study, illiteracy has been interpreted as scoring below the 2.0 level on the combined sections of the *Stanford Achievement Test*—Reading. This is the level chosen by the Buffalo Adult Education classes to differentiate between beginning and second-level basic classes.

Educational characteristics are defined as being those factors most likely to be correlated with educational achievement. In this study, information was gathered on selected background factors, performance abilities, and common knowledges.

Procedures, Subjects, and Materials. All students in the Buffalo Adult Education classes are given a form of the Stanford Achievement Test—Reading on entrance into the basic education courses. In this study, students were randomly selected from those who scored below 2.0 on the combined sections of this test.

The *Wechsler Adult Intelligence Scale,* the *Leiter Adult Intelligence Scale,* the *Davis-Eels Games,* and an individual inventory of background skills, interests, and knowledges were administered to each subject. Data are available on twenty-eight subjects to date of writing.

The use of the Wechsler, Leiter, and Davis-Eels tests was based on the recognition that they represent collections of tasks previously found to relate to learning. It was felt that the search for pertinent characteristics should include these tasks and knowledges.

The inventory of skills, interests and knowledges was constructed to provide information of value not usually available through the previously mentioned standardized instruments. An attempt was made to tap a number of areas of background experiences, knowledges necessary to function in urban society, personal possessions, orientational and directional knowledges, time and sequence knowledges, costs of common items, travel, rhythm, and reading-associated interests.

RESULTS

Even though the data have not all been collected for analysis, many trends are already discernible. From the twenty-eight cases completed to date, it is possible to describe the illiterate Negro adult subjects as almost all of rural background, with seventy-five percent having been reared on a farm. Only a little over a third of them (36 percent) were reared through adolescence by their parents. Even if rearing by either parent singly is included, only fifty-four percent of them were reared by one or both parents. On the other hand, family size was high with forty-three percent having come from a family group of ten or more children, and an average of seven children per family.

As might be expected, few of them had their own bed, and fewer had their own room, indicating little chance to be alone to think. As might *not* be expected, eighty-one percent reported that they always had enough to eat, and only three indicated the lack of food was of any real concern.

Even though the personal inventory was completed by individual interview, it was sometimes difficult to get an accurate view of the schooling background in the childhood family of the subjects. Over half the subjects reported that they did not know the extent of education of their parents. Fifteen percent indicated their mother had at least entered high school. Twenty percent reported their mother had had less than one year of schooling. The remaining fifteen percent were scattered throughout elementary school.

In giving reasons why they did not attend school themselves, it must be remembered that this was a self-report instrument. The reason given by most of them was that they were needed at home (82 percent). Next highest reason given was lack of school available (46 percent). A few indicated parental or personal disinterest, but none of the subjects blamed their lack of attendance on the quality of the teaching or on personal illness.

It was interesting to note that all the students tested had lived in the Buffalo area for at least four years, and almost eighty percent had lived there for at least ten years. Eighty percent of the subjects had previously lived in the Southeast, and only one subject had been born in the Buffalo area.

Forty-two percent of the students tested had no one who could read in their present family situation, although several indicated they had a "reader" whose services they could borrow if necessary to read mail. Of those who did have someone who could read, they indicated the newspaper and the Bible were most often read to them.

The subjects were asked why they wanted to learn to read, and their answers were highly utilitarian. Many of them indicated they wanted to be able to take care of their own needs by being able to read signs, cash checks, get a driver's license, read recipes, read their own mail, and write their own letters. They reflect a high degree of dependence on other people.

Fifty-nine percent wanted to learn to read in order to get a job, fifty-six percent to get a better education, and forty-eight percent to be able to read the Bible. Infrequent choices included reading for information or to understand the news (26 percent), reading for pleasure (11 percent), and reading to children (11 percent).

In the area of personal possessions, eighty-nine percent had radios, eighty-five percent had television sets, forty-eight percent had telephones, but none owned his own home or car. Only a few received a paper or magazine at their home (26 percent). Most of them have a refrigerator (81 percent), and fifty-two percent have washing machines.

In functional knowledges related to their possessions, it was interesting to note that although most of them knew what to do if their telephone was out of order (81 percent), and where to borrow money to buy a house (88 percent), fewer of them knew there was any other cost to car ownership than the purchase price (51 percent), and only a small number (11 percent) knew how cold the non-freezer part of a refrigerator should be, or could name the call letters of local television channels (19 percent), or to whom one might call to object to a television program.

The subjects were able to distinguish left and right in several tests, but when direction and/or movement was added, only thirty-six percent were able to maintain their orientation.

The subjects were able to orient themselves to maps of the room in which they were seated, to their location on a city map, or to the location of Buffalo in relation to Canada, Chicago, or Georgia forty-eight percent of the time. The relationship to Chicago was far more difficult than the other two locations probably because of their lack of experience relating to it.

In tests of telling time and recognizing time-task relations, such as starting work or eating lunch, the subjects did little better. They had an average passing rate of fifty-nine percent.

Although they averaged ninety-one percent correct response recognizing the costs of such common items as milk, gum, pop, and a phone call, there were only thirty-five percent correct responses to the numbers they would use to call the telephone operator, and to call information.

They proved to be a poorly traveled group, with many of them having made no trips to such places as the zoo, or other places outside their immediate neighborhod. Thugh most of them made the trip to Buffalo from distances greater than five-hundred miles, they tend not to have made any other such major trips, and twenty-two percent of them report they have never visited any other city as large as Buffalo.

Noting the speculation regarding the relationship between ability to reproduce rhythmic patterns and reading ability, the subjects were asked to tap their hand on the desk top in the same fashion as the examiner. They were successful only about one-fourth of the time in reproducing three rather simple patterns.

The subjects were presented with forty-four paired titles of books, the titles having been composed to represent areas of possible reader interest. Among these were titles in vocational improvement (Train Yourself for a Better Job), personal appearance (Good Clothes to Look Nice), religion (The Life of Jesus), sports (The Winning Team), animal stories (Animals I Like), children's stories (The Duck That Could Not Fly), humor (Jokes and Funny Stories), and simulated basal reader story titles (Tom and Jane Help Father). The titles selected by at least ninety percent of the subjects related to vocational improvement, personal appearance, religion, peace, health, and history. The titles excluded by ninety percent of the subjects related to animal stories, child fantasy, humor, basal titles, and crass commercialism (100 Ways to Make Money)!

It seems apparent that the titles these students would find most appealing are those dealing with personal improvement, whether vocational, health, or religious. They are also somewhat interested in history, but little interested in politics or government at the local level. Neither are they interested in titles pertaining to the beautification of their homes. They view the business of education as being important to them primarily as a utilitarian thing having little use to them as a source of pleasure or as a part of "the life beautiful."

In their choice of titles and in their behavior during the interviews, there was marked absence of hostility. They were cooperative almost to the point of docility. It is possible that this is a result of their overwhelming dependence on others, yet it is likely that it has in turn had an effect on the lack of achievement in reading. Not only are they not aggressive in personal relations, but they are not aggressive in pursuing achievement. This is reflected in the low estate they assigned the title "100 Ways to Make Money."

It is interesting to note that these students who are so amiable in their personal relations were most reluctant to choose titles which were of a light or jocular nature, or which seemed somewhat childish.

Standardized Test Measures. Some of the specific lacks of knowledge of the adult Negro illiterate were manifested in the standardized tests. In the Wechsler, for example, the overwhelming majority of subjects missed every question after number five of the Information Subtest. They did not know where rubber came from, the names of four Presidents since 1900, the number of weeks in a year, nor the direction one would travel in going from Chicago to Panama.

In comparison with the norms for the WAIS, the adult Negro illiterate does better on Comprehension than on any other part of the test. He does most poorly on Digit Symbol (in which his lack of practice of left-to-right progression and use of a pencil legislate against him), Digit Span, Similarities, and Block Design. They had some degree of success in the simpler steps of the Arithmetic sub-test until they had to deal with the number of inches in a foot in order to find the number of inches in two and one-half feet. Only two out of twenty-eight were able to solve this problm.

The *Leiter Adult Intelligence Scale* is a measure used primarily for testing handicapped individuals. The performance section of the test is given without the need of any oral communication. The group averages of the subjects, however, were not high enough on any of the sub-tests, verbal or performance, to reach the lower end of the norms. Thirty-six percent were unable to do any one of the ten similarities and ten differences in the test. The Pathways sub-test was found to be poor because it required the subject to be able to count and to remember the order of the alphabet, and even when they recognized these numbers and letters they were unable to hold and transfer from the practice sheet to the test. In the other performance tasks the subjects experienced almost as much difficulty with manipulation and perception.

The Davis-Eells showed the subjects to be most effective in the sections of cartoons testing the student's ability to perceive and interpret the situation, and testing the "Best Way" of solving a problem. They were least effective in handling the arithmetic computation "change-making" section. Their ability in handling analogies was intermediate, but showed a wider range of abilities than the other tests.

SUMMARY

The subjects in this study of adult illiterates in the city core area of Buffalo are all Negro. They exhibit a great lack of common knowledge on which to base instruction. Most methods and materials created for their instruction will need to recognize that these people must begin at an extremely low level and provide for a broad *educational growth* rather than narrow *skill development*. In other words, these people are *not* "just like other people with the exception that they cannot read." These people have learned little from their environment, for whatever reason. They tend to be non-perspective and therefore, difficult to teach. This calls for unusual use of meaningful repetition.

They tend to be very dependent on others, and this would seem to affect their learning potential. They seem to "withdraw" to some extent from their environment. Even though they tend to be rather consistent in their attendance, they do not tend to commit themselves in their learning. Instruction will need to be aimed at interesting them and involving them as much as possible in their learning.

They tend to be interested in concrete, utilitarian kinds of topics for study. They are less interested in reading about fantasy, humor, and childish topics.

They do not seem to be greatly interested in pressing political or social topics of the day. It may well be that their environment is not only sterile, but *painful* as well, and the logical topic for their reading reading improvement may *not* be reading concerned with their social plight.

One further comment relates to their rather highly religious interest. They have little interest in the violence and strife often associated with city core life. They tend to be rather more quiet, and although they are faced with and live with many pressing moral issues, it seems improbable to expect them to respond to the sort of reading materials which make the most of its attempt to interest delinquent and predelinquent boys by including stories of gang fights, switch-blade knives, motorcycle clubs, and hot-rod racing. They are not only puzzled by these stories, they *do not care* for them. These are the people who almost all chose the *Life of Jesus* over *100 Ways to Make Money!*

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The Language of the Socially Disadvantaged

Charlotte K. Brooks
District of Columbia Public Schools

WHAT IS THIS LANGUAGE?

Is language really just a stream of sound broken into sentences and phrases, words and sounds? Is standard English a status symbol, marking those who speak "correctly" as intelligent and good; branding those who speak "incorrectly" as stupid and bad?

Charles Fries (3-13) characterizes standard English as:

> A set of language habits in which the major matter of the political, social, economic, educational, religious life of this country is carried on. To these language habits is attached a certain social prestige. It is this set of language habits . . . which is the 'standard' not because it is any more correct or more beautiful or more capable than other varieties of English; it is standard solely because it is the particular type of English . . . used by the *socially acceptable* of most of our communities, and insofar as that is true it has become social or class dialect in the United States.

Is it the teacher's task to lift students from their stupidity and badness to intelligence and goodness? This job is difficult when the teacher has himself been lifted—or has lifted himself by his own bootstraps. He is in constant terror of slipping. He is on the edge of an abyss into which he might fall. Only constant vigilance saves him from *Me an' him went over my cousin house* or *I ain' goin' no 'place* or *That 'ere pin don't write good.* If he falls, he sins; he is doomed to lower class status.

Jean Malmstram (5:15) says that in Jamaica education is conducted mostly in Standard Jamaican Talk, and that the Jamaican who is secure in his social status—high or low—is secure in his language usage. The unhappy Jamaican is the one who has been educated beyond the status of his ancestors and who now scorns Folk Jamaican Talk but is not completely sure of his Standard Jamaican Talk. He must be uncomfortably careful as he speaks Standard Talk and avoid Folk usage. This, I suggest, can be as true of American educators.

"Aspiring middle class teachers," says Donald Lloyd (4:53)

> have a set of attitudes partly learned in the school and college training of English teachers with its monolithic fixation on 'correct English' as the main proper outcome of education in English and the language arts. It is a fixation often nourished in the teacher's own sense that only by parting with his origins, learning correct English, and moving out of the neighborhood has he been able to cut himself off from the foreign, rural, or working class ways of his parents.

Lloyd goes on to discuss the problem of Negro teachers who sometimes communicate their own tension to the child's ultimate trauma about language.

A Difficult Task. The task of changing language patterns is quite difficult when students reject the standard English and choose to speak the nonstandard dialect. And don't be fooled; the choice is often made deliberately. Many who choose to change do so. Sidney Poitier changed his West Indian dialect to standard English because he wanted to become an actor. He chose to change. A Negro psychologist and educator in Chicago chose to change from nonstandard speech because he wanted to enter the two fields cited. These men were compelled to change; no teacher led or forced them to this, and no teacher can. The compulsion must come from within.

The task is exceptionally difficult when there seems to be no need to change from non-standard to standard English. When persons communicate well with family and friends, when the whole community speaks in the same way, when only outsiders—teachers and the rejecting power structure—seek to enforce a change for reasons that are not clearly understood, when people are told constantly that they are wrong although everything within the community shows clearly that they are right: when these things are true people will not change. When the peer group accepts them as they are and rejects them when and if they change, when they are slapped down for "actin' uppity;" called "Tom" or "high-falutin," when they lose friends, when the other society will not take them in if they *do* change: when these things happen, they will resist change. These people know how to survive, and they know—or think they know—what is best for them. Why should they do all of the changing?

The task is just about impossible when weary and worn-out old ways are used to secure a change in speech and usage. When children are accused of having lazy tongues, when they are ordered to open their mouths, to sound the endings, and are—actually or by implication—told that they are slow when they close up like clams because their language is not acceptable: when these things are done to children, they cannot change. When older students and adults drearily do dull daily drills, when they endlessly underline subjects and verbs in stupid sentences, when they interminably outline outdated sentences no-one ever uses in real life, we know they are not helped. Jack R. Cameron (2:145) says that for many years teachers of English have been warned that the language they advocate has slight relation to the language used in the world.

To get on to reading, intelligent, mature speakers of non-standard English must gag at reading these silly sentences in puerile primers:

Look, John, look.
Oh, see Puff.
Puff can play.

I will not go into the content of such books, nor will I discuss the many reading approaches now being considered for remedying the situation. Educators and publishers, moving slowly and with uncertainty in some cases; far too quickly in others, are attempting—sometimes successfully—to cope. My primary concern here is with attitudes; not with specific content or method.

A Personal View. Let me tell you something that I know about myself. You have been listening to me, and I assume that you understand what I am saying. At least you can follow my speech, and my usage is not confusing. A friend who is a speech teacher tells me that I am guilty, almost constantly, of the "i for e substitution." That is, I say *pin* for the writing instrument and for the fastener. I attended school in Mississippi, the home of my mother and father, so this is not strange. But—my language has always been just like this, and I sound very much like my mother who was born and reared in Mississippi. In short, when I started school my teachers accepted me as a speaker of standard English, and I learned to read and write without trouble. I had no new language to listen to and learn; no non-standard language to unlearn before I could proceed.

Let me admit something also. I am not at all immune to the balanced beauty of literate language. I always found it easier to teach students whose language I understood and who understood and responded to mine. I prefer the polished phrase, the educated epigram, the wonderful words of wisdom that flow smoothly from the lips in liquid syllables. Mumblers and fumblers for words make me impatient. There are many words and phrases that cause me to cringe in middle-class misery—and among these are some listed by linguists as acceptable. I despise the cigarette that tastes like a cigarette should.

What I am objecting to is a lack of linguistic knowledge among educators—a lack that makes them insecure about their own language and critical of the language of others; a lack that makes them fail to accept non-standard English. I have heard Dr. Ruth Strickland say that children come to school knowing grammar and knowing it well. If the grammar is non-standard, teachers insist that the children don't know any grammar, make them unlearn it, and attempt to teach them a new one, alien to their lives. This is the rejecting attitude that I deplore. As a child I did not experience this; I simply learned the rules for a language I spoke and found acceptable in school.

"And Dig All Jive." May I share with you an experience that Gerald Weinstein (7:1-3) had in a secondary school? He was then with the Urban Teacher Preparation Program of the School of Education, Syracuse University. He was called upon by a teacher who had given up on the tough problem of teaching poetry to an unresponsive class. Weinstein went into the class with "Motto" by Langston Hughes.

The poem deals with the speaker's method of playing it cool and "digging all jive" in order to stay alive. His motto is "To dig and be dug in return."

After passing out the poem without comment and giving the class a chance to read it, Weinstein heard someone say, "Tough." This led to an inductive lesson in language and literature, for this teacher "dug all jive" and knew what "tough" meant. In non-standard English, the class engaged in a literary and linguistic discussion of the poem. Weinstein (5:2) proved that he understood this language and revealed—most importantly—that he could speak a language they could *not* understand. This put him at the heart of the matter: the necessity for their knowing many kinds of jive—or language—including his. They discovered what they thought Langston Hughes was saying: that persons, to stay alive, must dig more than one kind of jive—must master more than one kind of language.

And by persons Langston Hughes, Gerald Weinstein, I mean teachers as well as students must do this. It can be learned from linguists, from radio and television, and from students. If teachers are willing to learn as well as to teach, perhaps students will be equally willing to teach as well as to learn.

WHAT ABOUT THE LANGUAGE

Educators, publishers, and the public at large are castigated by Cameron (4:146) who states that experts have offered little in the way of textbooks that take a more practical, liberal stand in matters of language. In fact, a dreadful kind of non-English is still perpetrated in the name of good English, and linguistic follies like the distinction between shall and will, "The winner is I," "The baseball experts are they and we" and other atrocities are taught as standard English.

In a talk that I gave (1:728-729) in San Francisco several years ago, my own attitude is apparent. For example,

> Linguists say that all languages and dialects are really of equal merit, and that good language is simply language which gets the desired effect with the least trouble for the user. . .
>
> Many teachers of the language arts, themselves the products of the so-called middle classes, teach . . . as though standard English speech and usage were historically and geographically fixed and immutable, with certain well-known laws that always have been and always must be obeyed. Textbooks—those best of all authorities—have blandly stated these laws and teachers have inexorably taught them. Nice little girls and good little boys have easily learned and practiced these correct forms because, invariably, thsi is the kind of usage that they have always heard and seen. . . . With few problems in the language arts, these children have moved from elementary to secondary school, and then usually to college and to professional careers.
>
> The others: On entering school they have learned very quickly how unlike the socially accepted pattern they are. . . . Teachers have said, for example: 'Her speech reflects her personality traits,' or 'Careless, sloppy speech reveals a careless, sloppy person.' "

In the same talk I spoke of my experience in Birmingham (not Birmingh*am*) England, where I never did understand some of the "brummy" I heard, and where my family shared funny and sometimes embarrassing experiences because of language differences.

We learned that we must not request a cot for our large son, Joe. An American cot is an English crib.

We learned—after a mad tea party—not to ask for napkins. These are diapers, and we *did* have them on the table at that tea.

We learned to accept, "The team are ready" and to place useless "u's" in words like *colour* and *labour*.

I learned to teach the full stop instead of the period, and the comma instead of the colon after the salutation of a business letter.

I learned to ask for the litter bin instead of the trash basket, and for drawing pins instead of thumb tacks.

Best of all, I learned to be less dogmatic about the English language. After all, the British spoke it first.

Possible Approaches. William La Bov of Columbia's Department of Linguistics has asked why Negro children are placed in slow classes because they do not perceive certain sound differences, when standard speech gives only faint signals. Who can hear the final sounds of asked and got. (I asked a question and got an answer.)

A possible approach, suggests La Bov, may be the foreign language one; that is, teaching standard English with some of the methods used in teaching English to foreigners. In the 1963 speech, I advocated this (1:733):

> The same media used for teaching foreign languages should be used for teaching standard English as a second language: interesting objects and pictures, tape recorders, records, television programs, language laboratories, films, and new textbooks based upon the findings of linguistic science.

Shortly after the San Francisco meeting, the staff of the Department of English began planning a communications laboratory with the help of several interested teachers. Last year the Office of Economic Opportunity provided funds and that laboratory is now functioning in a junior high school as part of the Model School Division of the District of Columbia Public Schools. We are completing standardization of a more elaborate communications suite, where specialists in remedial reading and in speech correction will work in rooms adjoining the English communications laboratory.

In the laboratory a resource teacher who was involved in the initial planning is working with the basic listening, speaking, reading and writing skills. The room is filled with colorful and readable paperback books for skill building as well as for enrichment. Booths, tape recorders, listening posts, programmed materials, and other innovations are being tried. In-service education has been provided for the second language approach, and this will be built into the suites now being standardized.

Some Suggestions. We need not reject the first language of any person, whether that language is a foreign tongue or non-standard English. We must leave his language alone while we learn as much about it as we can. Every person deserves respect for what is his own: his pride, his personality, his differences from others: his language. And a part of that respect must be a willingness to learn from him, through learning to understand his language. Only then will he be willing to learn from us—and that includes learning our language. Only then can we show how necessary it is for him to learn standard English; to "dig all jive."

English laboratories should be planned for each community to meet the needs of that community. Where there are communications suites, developmental activities can go forward in the laboratory, while remedial and corrective cases can be treated in the adjoining reading and speech clinics.

Material must be prepared on all educational levels—pre-school to adult—for the socially disadvantaged. Books, records, tapes, transparencies, filmstrips and other instructional aids must be geared to the new need.

Most importantly, educators—especially classroom teachers—must be given opportunities to learn and to try out the approaches, techniques and new materials. And they must be encouraged to devise creative and innovative approaches of their own, and to try these out also. There is more latent creativity than we have yet uncovered among teachers.

The war on poverty must include a war on impoverished attitudes among educators and self-righteous communities. For until we realize that standard English cannot be equated with intelligent and good non-standard English with stupid and bad, there will be a real poverty of thinking. Until the self-righteous who have always spoken standard English and the often even more self-righteous who have learned to do so stop thinking of themselves as models who must be followed uncritically from the hell of dreadful language to the heaven of pedantic speech, this country will be deprived of the rich cultural heritage found among many users of non-standard English. For many of these people—and I include their children—have a pride that must not be destroyed by Miss Fidditch.

Some will be silent, except when they are among their own. These are often called slow, withdrawn, apathetic. Some will talk quite a lot. These are usually characterized as coarse, crude, vulgar. As long as educators use the old approaches excoriated in this paper, these people will either accept the image of themselves or will reject it and the standard language. They'd rather fight than switch. Why not; no doors will open, automatically—they think—when they change.

Edwin Sauer says (6:37-38)

> the really serious language faults of our time are more likely to be heard in high places than in low. The gardener who says to his employer, 'I ain't hardly got no room for them tulip bulbs,' will be understood. . . . But what can a reader do with a statement like this from a business letter written by a top industrial executive? 'Gentlemen: In re your communication as to the expediency of our continued controls of merchandisable materials, may we state that, pursuant to many requests from patrons, we are endeavoring to expedite delivery of such materials along the line of equitable distribution.'

Surely this is as non-standard as the speech of the socially disadvantaged.

And A Conclusion. If language is a status symbol, the socially disadvantaged lack status because they speak non-standard varieties of English. If they have rejected standard English they will continue to be socially disadvantaged. And social disadvantage leads to educational disadvantage. If, however, fresh approaches and techniques can be tried, the socially disadvantaged may be seen in a different light and may be helped then to see themselves and the advantaged in new ways. Lloyd says (4:51) that reading instruction should not be combined with an effort to change dialectical peculiarities ". . . regardless of the difference in prestige." Linguists say that Miss Fidditch—the linguistically ignorant teacher—should leave the language alone. I say that if some of the attitudes and approaches suggested here can be tried, the socially distadvantaged, in the unexpected pleasure and surprise of finding people who accept them and their language, may be willing to learn standard English. This may be one of the most important ways of breaking the terrible cycle of social and educational disadvantage—a cycle that dooms so many to lives of frustration, misery, illiteracy and fruitless rage.

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A Reading Program for a Job Corps Urban Center

Richard Fry

Rutgers

This paper is a discussion of the reading program at the Job Corps located at Camp Kilmer, New Jersey, at an abandoned Army embarkation depot, operated under a contract with the Office of Economic Opportunity by Federal Electric Corporation, a subsidiary of International Telephone and Telegraph.

Rutgers University holds a subcontract for the purpose of providing consulting services in both the academic and vocational training areas, as well as some of the sociological aspects of the living environment. More specifically, the Graduate School of Education is providing some professional consulting services of regular faculty members and specially employed faculty members in the areas of vocational training, academic curriculum, and psychological counseling. The university also supervises a few regularly employed graduate students working in the areas of reading and counseling. The University School of Social Work is providing similar services in the area of living environment.

Perhaps a word or two about the organization of the Job Corps is in order. Basically, there are two types of establishments. The type described in this paper is called an urban center, which means that several thousand boys live there full time for an indeterminate period of 6 months to two years. These boys are frequently high school drop outs from lower social economic levels. They have about half urban and half rural backgrounds, and are about half white and half Negro. They are supposed to have some academic skills. This is not clearly defined, but by some kind of rule of thumb it means better than fourth-grade reading ability. The screening is done primarily by recruiting centers under the Department of Labor and is not always too accurate.

The other main type of Job Corps establishment is the rural conservation camp. These camps are often located in national forests and are much smaller, averaging between one and two hundred corpsmen who have lower academic skills.

The curriculum for the smaller camps is largely determined in Washington, and reading materials, for example, are selected by the Washington office of the Office of Economic Opportunity. The curriculum organization and material selections for the larger urban center camps are determined by the center contractor.

Thus in our center the ultimate responsibility for the selection of the curriculum lies with the officials of the Federal Electric

Corporation. They are given recommendations and advice by the University, but the choice is theirs. They also have their own curriculum staff.

The corpsman's day is divided so that half a day, 3 hours, is spent in the academic classroom and half a day, 3 hours, is spent in the vocational training shops. There also are numerous avocational activities such as sports, various clubs, recreational library, student government, Explorer Scout troops, marching drill teams, glee club, and even voluntary evening courses in foreign languages.

The boys' living conditions are fairly satisfactory. They are housed 3 to a room in refurnished army barracks, fed good food in a mess hall, and given some military surplus fatigue clothing as well as a modest clothing allowance that is spent under staff guidance in local stores. In addition, they are given frequent weekend hours of liberty in nearby communities and engage in community recreation facilities such as bus trips to the World's Fair or dinners in private homes arranged by community organizations.

The academic day follows a kind of team teaching approach in which a team of three teachers, one each in the area of social studies, mathematics, and language arts is responsible for one dormitory group of 32 boys during the morning session and another dormitory group of 32 boys in the afternoon session.

The academic teachers range in professional training from those who are fully certified, experienced, secondary teachers in the area in which they are teaching, to those who have only a bachelor's degree and no professional training or experience in teaching.

The first problem in the reading area is that reading as a subject is not clearly identified in the time table or curriculum organization. Somehow or other, it is supposed to be a major part of the language arts curriculum program, but if a teacher's main interest is literature or speech, this may not always be the case. It is also possible that in some three-man teams, the social studies or mathematics teacher may have a more dominant role and disproportionately larger share of the training time. Federal Electric Corporation officials and the teachers have quickly learned many educational "good-think" statements such as "the teaching of reading is part of every subject."

Another difficulty arises from the fact that the curriculum was planned and materials purchased with little participation by those teachers who are now using the materials.

Now, however, a type of subject matter departmental organization with increased teacher participation is being implemented. It is good to see industry try different methods of educational organization, and it is also somewhat comforting to see at least a strong suggestion that they feel that the public schools might not be so ignorant after all.

In mentioning problems such as this, it is not my intention to derogate an organization with which I am associated, but rather to discuss with fellow professionals some of the problems involved. Presumably some of you are or will be responsible for reading programs in job corps or other war on poverty type projects, and we would be happy to have you learn from our experience. As far as the over-all job corps picture is concerned, there are at least as many problems in those camps run by universities as in those run by private enterprise.

The real miracle of the job corps is that it is operating at all. Barely a year ago it was a faint idea on the drawing boards until President Johnson declared all out war on poverty and backed it with the U.S. Treasury. As in any war, hastily building the Army is a very expensive process. The over-all cost of keeping a boy at the job corps at present compares very unfavorably with the cost of keeping him at a first class university. But then the job corps has only been in business about a year, whereas universities have hundreds of years behind them.

The cost of running Camp Kilmer, for example, is over 12 million dollars for an 18 month period. It presently has a little over a thousand corpsmen in it and eventually will have 2,500. Even allowing for the living expenses, this is still a budget that would make most high school principals delirious with joy. The Government's rationale, which is sound, is that if these young men can be changed from tax eaters on relief to tax payers, the government will more than get back its investment.

The job corps also represents a change in social thinking and responsibility. No longer will the richest nation on earth tolerate the inharmonious fact that a minority percentage of its citizens live in hopeless frustration and squalor.

But back to the reading program *per se*. It quickly became apparent that the pre-induction reading screening was not accurate. Some students had little or no reading ability. Hence a reading clinic operation was set up which has several special reading teachers assigned who see selected corpsmen on an individual or a very small group basis for an hour a day taken from the 3 hour academic period. These corpsmen were usually reading below the fourth grade ability and comprise about 5 per cent of the camp. However, the university felt that the screening was not accurate and with more exacting screening procedures this figure probably would double.

The reading program has also been hampered by lack of accurate test reporting. According to the organizational structure of the camp, all formal testing is done in the counseling division which is entirely separate from the educational division. The counselors, who often have a clinical psychology orientation, tend to feel that test results are confidential and need to be interpreted on an individual basis. This meant that teachers were not given reading achievement or intelligence scores. Efforts are being made to remedy this situation, but success thus far has been minimal. Since educational division is denied access to systematic reading scores, the average reading level of the camp can only be inferred from partial results, namely, a sample of 95 incoming corpsmen. Using the *California Achievement Test,* junior high school level, these corpsmen had an average comprehension score of 7.9 and a vocabulary score of 7.7. Since this example was based on relatively early arrivals to the camp in the spring of 1965, it was felt that the reading achievement level of the average corpsman has been falling and, at present, the average incoming corpsman reads at about the sixth grade level.

Using the *Gates Reading Survey Test* for 37 corpsmen who were admitted to the (remedial) reading center, Dr. Martin Kling found that the mean grade level score in speed, vocabulary and comprehension was 4.1 for each of the three sub-tests.

Dr. Kling is currently engaged in a survey of the reading needs. More specifically, he is looking at manuals and texts in the vocational training area and computing their readability. Often he finds that basal vocational instruction materials require eighth grade reading ability.

Hence the basic problem here is quite obvious. Reading needs, to obtain and hold a job, are definitely higher than the present reading ability of the corpsmen. This problem is further aggravated because in most fields, there is a rapidly changing technology so that a corpsman who is taught to operate a specific piece of equipment today may in the future be required to operate a new piece of equipment, in many cases by reading an operator's manual. Employees who do not have sufficient skills to read the new manual may not remain employees for very long.

Now for some specific discussion of reading techniques. One of the chief means used by the classroom teachers for selecting remedial readers for special training and for identifying reading levels of the regular corpsmen is a set of oral reading paragraphs which the writer developed over a number of years of reading clinic work. These short paragraphs, in the Betts tradition, determine basal instructional and frustrational reading levels from grades one through seven. Since they do not measure reading comprehension and do not need to be read in entirety, a student suspected of reading at sixth grade level will start with a sixth grade paragraph. They can be administered in several minutes to determine a curriculum starting place of reading difficulty level.

These paragraphs are all the more necessary because of lack of consistent information on standardized tests coming from the counseling department. In addition, these paragraphs give what we call "presence" which means that the teacher can really see and feel that the child is at this level as opposed to a sometimes ignored or disbelieved cold numerical reading score spewed out by a computer or a psychometrist as the result of a group reading test often administered outside the classroom.

Successful reading materials in the job corps remedial reading situation are much like similar methods and materials found in many reading clinics. More specifically, the *SRA Laboratories*, the *McCall Crabbe Drills* and *Readers' Digest* materials have been used successfully. Two different types of program instruction material, the *McGraw-Hill Constructed Response Programmed Reading*, and on a more advanced level, *California Test Bureau's Lessons for Self-Instruction* which are scrambled books in reading and language arts areas of about third through seventh grade difficulty levels have been successful. From an audio-visual standpoint two types of materials are used. The first are tachistoscopic film strips such as the *Instant Words* and *Instant Word Phrases*, and phonics put out by Learning Through Seeing. The other much used AV device is the *Language Master* with specially prepared cards. Remedial teachers also attempt to do an informal diagnosis of phonic skills. These skills are taught by games, workbooks and teacher presentation.

Language arts teachers in the regular classrooms can and do use some of the materials used in the remedial reading center. Also, they frequently use the *SRA Laboratories*, the *Lessons for Self-Instruction*, *Readers' Digest Skill Builders* and adult reading materials, and adapted classics.

The camp has an interesting paperback library arrangement with a local distributor. The camp librarian selects several hundred suitable titles which are stocked in quantities of one to ten in a special paperback library. The camp then pays for books only if and when they are checked out by the students—thus the initial cost of the library is nothing, and only books actually used are paid for at wholesale cost.

The language arts instructors also teach writing, listening, and speaking skills. The instruction and formal grammar varies with the needs of the students. One of the vocationally oriented writing improvement books is *Vocational English* by Albert Jochen and Benjamin Schairo.

Writing and reading skill lessons are also sometimes centered around such practical tasks as the filling out of job application blanks, home loan applications, and income tax forms.

For a small minority of the students, more formal academic preparation is being given which will enable some of them to take a high school equivalency examination and thereby obtain a secondary diploma. There is even hope that a few of the boys will be able to graduate and enter a university.

In the early days of the camp, hopes were high that a good deal of the language arts curriculum material would be specially developed for this type of youngster by camp personnel. This hope has largely been unrealized. Part of the difficulty is that administration did not quite understand how difficult it is to prepare curriculum materials. Part of the difficulty involved in generating curriculum materials at an Urban Job Corps Center revolves around the shortage of qualified personnel to perform the task as well as the salaries required to attract such people. Most of the reading and language arts instruction is in fact being done with commercially prepared materials. Sometimes these materials are modified; for example, some stories in the SRA Labs are much more suitable than others, so teachers often use a selection process in allowing or encouraging students to read certain of the laboratory cards. The same is true of drill materials found in commercially prepared workbooks.

One fairly successful attempt in preparing reading comprehension materials was to use the cloze technique on passages selected from vocational training manuals. For those unfamiliar with cloze, it is a reading comprehension testing or teaching procedure in which words are deleted from a passage. The student's task is to replace the correct word. One advantage of this type of material is that it is quite easy to prepare. It is much easier to omit words from a paragraph than to write multiple choice or even essay questions. The words deleted may be random or on some pattern such as every fifth or tenth word. Also, a more rational approach can be used such as omitting just specific subject matter words.

The cloze passage may be made one of two ways, the first and usual method being to have a blank appear in the passage and the student attempt to write in the missing word. The second method is to have two choice words beneath the blank and the student selects one of them as the correct choice to fill the blank.

Another specific reading procedure used by the regular classroom teachers is a modified adult reading course emphasizing speed and comprehension. This is seen largely as a unit on reading speed improvement for the normal readers and follows the general outline of a paper of the National Reading Conference. These methods are also described in the author's book, *Teaching Faster Reading*. This reading improvement unit takes the form of one lecture and three classroom drills per week for a ten week period. It is accompanied by two 15 minute tachistoscopic drills per week based largely on the *Instant Word Phrases* flashed and written. Each student keeps a graph of his reading speed and comprehension. Comprehension drills are completed in the author's book, *Faster Reading, A Drill Book*. This reading improvement unit, while emphasizing speed, also contains segments on study techniques, comprehension improvement, skilling, and winds up with the unit on vocabulary improvement which is intended to lead the teacher on to further work in this area.

Finally, let me suggest that as part of the War on Poverty the

Job Corps is a joint effort of federal government, private industry, and the education profession. In some respects, particularly for government and private industry, it represents a real "swords into plowshares" operation. For example, our camp prime contractor, Federal Electric Corporation, has been a major defense contractor, and now they are devoting some of their talent and energies toward a specific educational and social service goal of educating underprivileged adolescents. We in the education profession are facing some old problems in some new settings. There is a different alignment of forces than under the traditional school board. The teachers are not all products of our schools of education. Our set of expectancies for the students is changing. Last, but not least, I would like to end on a happy note that for us in reading there are some crying demands backed by financial resources that we have not had before.

Literacy Programs Throughout the World

Ralph C. Staiger

University of Delaware
Executive Secretary—International Reading Association

One-third of the adults in the world today are illiterate. This is one billion of the three billion people in the adult population. One quarter of these are semiliterate, but 750 million adults know no reading or writing. The population explosion has not helped; even though many countries are engaged in literacy programs, the number of illiterates has increased by 45 million since 1945.

These dramatic statistics were discussed in Addis Ababa last summer at a meeting of the World Confederation of Organizations of the Teaching Profession. Aser DeLeon, Director of Adult Education and Youth Activities of UNESCO, was the speaker. Among the member countries of UNESCO, he said, eighty have a literacy problem, and there is a close link between economics development and literacy. "It is not necessary to convince ourselves of the need," he said, "but to decide what to do."

PRIVATE AGENCIES

For a number of years, literacy teaching has been conducted by private groups. The most famous of these is the Laubach program. Dr. Laubach delivered the invitational address at a recent conference and Richard Cortright, now Director of Education of the Laubach Literacy Fund, Inc., spoke to us on their activities, and many of us have participated in the work, often church-related, of Frank Laubach, a missionary whose leadership brought literacy to many primitive people. "Operation Alphabet," a television series, was foundation-funded, and brought instruction to many individuals in the United States. The value of these agencies is unquestioned, as a beginning. In all probability, their work will be continued, but their limited nature cannot be considered as a solution to the world literacy problem for a perpetual problem remains of providing reading material once the first stages of literacy have been achieved.

THE ADULT EDUCATION MOVEMENT

For many years, there have been government-sponsored adult education programs in countries of the world. Most of them have endeavored to teach basic hygiene, useful arts, and literacy. Teachers have learned that the first step in teaching reading has been the creation of a desire to learn to read. In our culture, we experienced some difficulty in understanding that the desire is not present. In primitive villages, however, as in some subcultures of our own, it is not a natural concommitant of living. When a poverty-stricken farmer can see the value of reading to his chickens—and his entire life, for he is economically dependent upon them—he may become interested in reading.

In many parts of the world, this readiness step has already been taken, and so adult education has become literacy education. The African countries, their representatives say, cannot wait for the present generation of school children to grow up; they must educate the adults. It is significant that in some of the countries it is considered the responsibility of *all* literate people to undertake the teaching of literacy classes. Short-term training courses for these volunteers is an emerging responsibility of regular teachers in many of these countries. Let us remember that in some of these emerging nations fifty percent of the national budget is devoted to education.

UNESCO INVOLVEMENT

During the past few years we have heard repeated utterances on the subject of illiteracy from the United Nations Economic, Scientific and Cultural Organization. This year is the third year of the United Nations Development Decade, in which the U.N. and its specialized agencies are committed to a war against "the ancient enemies of mankind—disease, hunger, ignorance and poverty." It was a 1962 UNESCO Survey which revealed the vast numbers of adult illiterates which has resulted in a World Literacy Program.

Basic approaches to literacy programs in the past have been mentioned above: the private organization approach, in which the government's effort has been concentrated on providing compulsory education for children; and the frontal attack which attempts to give all adults basic elementary knowledge of reading. A third approach has been developed by UNESCO and explored in several countries. It is called the selective-intensive approach. This campaign links economic development and literacy by conducting intensive efforts in the social and economic milieus in which adults consciously feel the need for literacy. Projects have been developed in which national resources are being combined with international sources in Ecuador, Algeria, Mali, Guinea, Tanzania, Iran and Pakistan. Eleven missions are being planned for other coutries also.

In discussing the UNESCO approach at a meeting in Addis Ababa, Aser DeLeon told the representatives of teachers' organizations throughout the world, "We call this approach intensive because it seems to us that the true literacy program—giving people useful knowledge—cannot be limited to a rudimentary literacy. We think that the world has reached the stage where the basic literacy, the three R's as we say in English, the literacy which is limited to writing and reading, is not enough. Therefore, when we speak of the intensive approach, we are thinking at the same time of an education which gives the people knowledge of reading and writing but which gives something more, which gives a skill, the technical and professional ability to be the master of their own job, and make it possible for them to increase their productivity at the place where they work. Therefore, it is, for example, a literacy which is linked in the industrial field with vocational teaching and linked in the agricultural field with the training of farmers.

"All this should lead to an increased productivity; the only way to save people from underdevelopment and to increased national income. This should be one of the main objectives of education as a whole. Therefore, in addition to the continuation of education in the struggle for human rights, in addition to the spiritual, religious, and human aspects which are a part of education at all levels, we believe that we should think also of the practical aspect of literacy in the struggle against underdevelopment."

It should be suggested that private agencies and national adult education efforts will be discarded, for there are many variations of literacy programs in the countries of the world. In many places, all three will be used simultaneously and in cooperation.

This is an area about which those of us concerned with reading will be hearing much in the future. Our contributions will be solicited, not only in terms of money through private agencies, but also in the development of new methods related to the specific needs of adults rather than children, and to the varying needs of individuals in cultures different from our own. This, in itself, is an important problem. The Literacy Committee of the International Reading Association is already cooperating with the WCOTP Adult Education Committee by contributing a chapter to a publication which will suggest ways in which a teachers' association might stimulate the production of reading materials for newly literate adults, a most important task.

It is my hope that when reading specialists are called they will answer. This is too important a task to be left to the volunteers alone.

Frontiers of Research

George D. Spache
University of Florida

This is not intended as a scholarly review of the research in college-adult reading. Emory Bliesmer's paper, in this volume presents an intensive review of recent studies in this field. Nor will this paper be an intensive analysis of the strengths and weaknesses of college-adult reading reports. The paper to follow this will offer such a critique. By this time, you may appreciate that I am in the position of the meat in the sandwich, except that it may appear that this sandwich has no meat.

Rather I shall attempt to emphasize facets of college-adult reading which still lack adequate research. Despite the impressive volume of studies, as exemplified in Bliesmer's review, and the many inadequacies in these efforts which are pointed out by Raygor, there still remains a need for more and, we hope, better studies. There are just too many unanswered questions in our field for us to be satisfied with the *status quo*.

Among the areas in which my lack of knowledge prompts me to feel there is need for further research are: critical reading; comprehension; individualized or auto-instructional procedures; the relationship between effective training programs and specific attributes of the learner; and more efficient ways of stimulating vocabulary development.

Critical Reading. In my opinion, most of the previous experimental research in critical reading has been severely handicapped by lack of a workable definition. Each researcher defines critical reading in his own terms, sets out to prove that he can improve it by certain approaches, and then concludes that his experimental training has been successful because he thinks that he has observed subjective changes in his subjects in keeping with his definition of the term. The experimenter may simply have conditioned his subjects to react more accurately to inferential questions, and since this was his definition of critical reading, his experiment is a success. Or, as exemplified in a number of studies, the experimenter defines critical reading as the ability to detect propaganda techniques, provides specific training and, provided he has sense enough to extend the training for a sufficient period, is apparently successful.

These atomistic approaches to a multi-faceted skill prove nothing, except perhaps McDonald's (5) repeated criticism that much reading research ignores the impact of the experimenter's goals upon student

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responses. Of course, students can be pushed to answer this or that type of question somewhat more accurately, or to label the writer's obvious tricks in presenting his material. But is this really critical reading? Or is it only one minor aspect of the total skill?

Until we can define what a critical reader is and describe how he reads (and, perhaps, how he listens and discusses) we cannot devise successful experiments in critical reading or intelligently evaluate their outcomes. Can you name a single test or other evaluation instrument which distinguishes in any comprehensive fashion between critical and naive readers? How actually does a college reading instructor distinguish between students who need such training and those who do not? Or, like most of us, does he simply assume that most college students will benefit by some stimulation in this area?

One approach to this needed definition of critical reading might be the observational and recording technique used recently by H. Alan Robinson (7) in studying the behaviors of a group of pupils engaged in a social studies program. By skillful questioning and analysis of taped material, fifteen major reading behaviors were identified and their successful and unsuccessful examples tabulated. Another approach might be the exploration of the associative-thinking processes present in a critical reading task, as used in the Piekarz study to compare good and poor readers. Perhaps these types of analysis might lead to an operational definition which would serve as a basis for later studies. In any event, a group of such studies would supply us with a body of information regarding the age levels at which certain components of critical reading are learned in the usual reading program, and which behaviors need to be delayed or given greater emphasis.

Comprehension. In contrast to the area of critical reading, we have a multiplicity of definitions of comprehension: operational, descriptive and analytic. We have conceptual models of comprehension, many, many lists of "comprehension skills" as well as the implications of the approaches through factor-analysis, cloze procedure and interview. (1, 4) Insofar as I can see, of all these various approaches to comprehension only one has had a significant impact upon teaching and testing practices. Most reading teachers at almost all levels are still approaching comprehension with a list of the skills in one hand and a workbook of some sort or other in the other. Much of the training in comprehension at all levels seems to consist of practicing in answering a fairly stereotyped set of questions on a series of reading passages. Occasionally these questions are varied slightly to emphasize one type of comprehension or another, or under the illusion that a slight change in the type of question produces critical reading as we have suggested above. What variations in both teaching and testing practices might be introduced if we attempted the research which would explore the implications of other types of definitions of comprehension? For example, what would happen if we were to follow the implications of the factor-analysis studies? Practically all of these agree indicating only three or four major components of comprehension, such as a perceptual speed, verbal ability, and reasoning. Even though these factor-analyses studies are based upon the evaluation of existing tests, they tend to refute the labels given to the subsections of these same tests. Yet to my knowledge, no one has attempted to build a measure of comprehension deliberately intended to sample these facets of the process. How might instruction and testing practices change if we accepted the implications of the interview studies? You will remember that several of these have explored the associative-thinking processes of the learner and made sharp distinctions between effective and ineffective readers. Again, there has been little or no research to broaden or deepen these studies, or to explore more fully their implications.

As indicated in Rankin's review of the relevant research, the cloze procedure is another measure of comprehension. (6) From a linguistic viewpoint, the cloze procedure might be considered to be dealing with the functions and relationships of words. Perhaps it is possible that the cloze procedure could reveal to us the manner in which the reader recognizes these functions and interelationships in the process of comprehending. Here might be a fertile area for the psycholinguist, which to my knowledge has not yet been explored. Finally, comprehension might also be explored by using a programmed approach both for analysis and teaching. In other words, using carefully programmed materials, supplemented by introspection and interview, we might well gain greater insights into the thinking process which presumably occurs. For example, is the comprehension of a main idea which is not obviously stated, the cumulative impressions from a series of details? How does the reader accomplish this symphysis of details into a main idea? What would be the most efficient series of steps in teaching the learner to accomplish this particular bit of reading behavior?

Technology and Reading Instruction. We are only beginning to push out on the frontier of technology and reading instruction. For the past few years, most of the research has been concerned only with the improvement of the hardware, the teaching machines, and the programs. Now that we have this fundamental information, and some acceptable instructional materials, we should certainly begin to explore the applications.

For which reading skills and habits are teaching machines and programs most effective: vocabulary, word attack skills, comprehension or even rate? How may the principles of conditioned learning be adapted to reading instruction in the classroom? How can we incorporate auto-instructional devices into the reading program? At what levels? For what purposes? With what degree of efficiency?

If we believe the advertising material that accompanies each bit of program offered for college-adult instruction, all of these have been adequately researched and have shown their values for inducing growth of certain skills. Yet the independent research which has attempted to test these claims is neither extensive nor very definitive. Staats has explored the application of principles of conditioning among younger pupils with some success. (10) Other studies by Raygor and Roffers (8) are exploring the values of visual and auditory reinforcement in rate training programs at the college level. In all probability, there are other similar experiments being conducted which have not yet been reported on. The new technology associated with conditioned learning has not yet been capitalized upon for its possible contributions to reading instruction. Undoubtedly it has much to contribute, as we have tried to imply, both in the analysis of some of the underlying processes and in providing better teaching techniques.

Training Procedures and the Learner. At the college-adult level, as indeed at all other instructional levels, we are still not very realistic about adapting training procedures to various attributes of the learner. Instruction is still largely a mass process and we appear to be satisfied with our results if we seem to help the majority of our students. Research in which the factors that influence learning are investigated are still too few or too inconclusive.

For example, what types of developmental or remedial college-adult programs are most effective for students of varying degrees of intelligence? The Heftel study indicates a marked relationship between academic ability and gains in reading rate. (2) Although the relationship was less, the gains in study-type reading rate were still related to academic ability. If other studies concur in this indication, there may be the implication that students admitted to reading courses which emphasize rate training should be selected from the higher levels of intelligence, if the training is to be highly effective. Another possible implication from this line of inquiry may be that the garden variety type of reading training course may not help the academic success of the lower level ability students, who may need some as yet undiscovered type of training. Beyond these preliminary studies, which need to be replicated, there appears to be little research in differentiating this instruction at the college and adult level in terms of the academic abilities of the populations.

Although most college-adult reading courses attempt an evaluation of the initial status of students in reading skills, there has been very little explanation of the relationship of this status to the type and degree of improvement that students make. Undoubtedly many instructors do differentiate their approaches according to the initial status of their students. In fact, in one junior college of my state ten levels of ability are differentiated and somewhat different courses offered for each level. What I am concerned with here is not the failure to react to the students' initial status and skills, but the failure to use this information as a basis for evaluating the results of training. Since students cannot be held in the clinic indefinitely, it is essential to identify a most effective trainng program for students of differing abilities. We must discover just how much reading improvement is possible for different students according to their initial status, and whether this is a realistic contribution to their assistance in college. It may be that we are attempting an impossible task for some levels of students, for some research evidence indicates very little relationship between reading scores and assistance in college among college freshmen who placed in the lowest third of their high school classes. I do know that many directors of college reading programs explore this problem and have devised within their own limitations what they feel are effective reading programs for different levels of students. However, very little information of this type has been published or validated by research.

Another area of the relationship between the learner and the learning process which needs further research is that which concerns the personality or temperament of students. We have had several researchers attempting to contrast the effect of various classroom climates upon students according to measured personality traits. Some of these have been conclusive; others give no definitive results. Since the atmosphere and the arrangement of the reading course can be varied considerably, we would like to see more attempts to evaluate this facet of the learning situation. I grant that this type of research regarding the personality of poor readers is fraught with a great many obstacles and the research is full of disappointing results. Perhaps it is fruitless to attempt to describe the temperament of a "typical" poor college reader, and our attention should be focused on the relationship of the reader's self-concept and his response to instruction as Hill and others have suggested. (3)

Finally, college and adult reading has seen little experimentation with various forms of classroom arrangement. Comparisons of the effectiveness of laboratory versus large group versus small group instruction are few. (9) Since the number of college students is on the increase, and demands upon college reading clinics will also increase in the coming decade, it would seem most practical to try to answer some questions about the effects of various types of grouping upon student reading improvement.

Vocabulary Development. The reports of clinic and classroom procedures in promoting vocabulary development at the college-adult level are not very encouraging. Although a number of approaches have been tried, none is outstandingly successful. Such common techniques as the study of roots and affixes, training in effective use of the dictionary, the study of various word lists, practice in contextual analysis, and the like, do not appear to produce significant growth, at least as measured by common vocabulary tests. Perhaps the use of vocabulary tests to measure the outcomes of such training is not very realistic, for it is often true that their construction does not lend itself to a reflection of the changes in student vocabulary. Yet at the moment, we have no other objective ways of determining what has happened as a result of the training.

It may also be that significant improvement of the bulk or depth of vocabulary at the college-adult level is a futile effort. Perhaps we should be satisfied with a kind of fundamental training in the minor vocabulary skills I have mentioned until we see that the student uses these with reasonable efficiency. When we have reached this point, we might consider the values of promoting a set in the learner for self-development, somewhat like the set accuracy producer by common comprehension training.

What I am suggesting is, perhaps, in the area of vocabulary the college-adult program is offering too little and too late. In any event, this facet of college-adult reading programs is wide open for further research, first to devise instruments which more truly reflect the results of vocabulary training; second, for more careful evaluation of the half-dozen techniques which we now use; and third, for an attempt to decide whether our emphasis should be upon cognitive or attitudinal behaviors in order to produce vocabulary development.

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A Critique of Reading Research

Alton L. Raygor
University of Minnesota

A request to present a paper on the topic, "A Critique of Reading Research," is a seduction into a trap. The most obvious lure is the temptation to give a sermon on avoiding the usual sins of the research designer. We could discuss the inadequacies of the pre-test—treatment—post-test design; the need for better experimental or statistical controls; the need to avoid Hawthorne, placebo, hello-goodby, halo, and regression effects; the need to avoid hiding negative results or insuring positive results; or the dangers of outside influences in research designs, differential mortality of subjects in experimental and control groups, and other design weaknesses.

Those people who are going to do the research we are going to pay any attention to already know about these elementary design problems, and will avoid them whenever they possibly can. Those who don't know and don't care, will continue to burden journals and journal editors with trash. No sermon will change that.

The second kind of enticement for a prospective speaker about reading research is the temptation to pull a sample of research studies and to do radical and public surgery on them. This is a snake in the grass because it serves no useful purpose except to allow the speaker to vent his pent-up frustrations and hostilities. Better he should beat his wife in private than to punish his colleagues in public! The weaknesses in research designs are usually painfully clear to the experimentor by the time he has finished the study, and to add insult to his already wounded ego is to do nothing constructive.

The most convincing reason for avoiding the sermon or the public hanging is that it doesn't tell us anything we didn't know. Like Freud's non-abandoned notion of neurosis, we find that knowing the problem exists doesn't make it go away. Like the patient who still fights with his father after the psychiatrist has spent much of his time and money teaching him that he loves his mother and envies his father, we continue to do inadequate research even though we know we are doing it.

So—you are to be spared the sermon and the public hanging. What *can* we do that will help? I was becoming very discouraged about my ability to contribute any meaningful or useful remarks on this subject when I came across a paper by Marvin Dunnette (1:3) on *Fads, Fashions, and Folderol in Psychology*. He has done a rather interesting analysis of psychological research with a sort of combined anthropological and sociological approach. I decided to look at fads, fashions, and folderol in reading research, and to see if such an analysis had anything to teach us. In addition to taking a naturalist or cultural anthropologist position, observing the reading research sub-culture, I want to engage in some speculations about what you might call the natural history of reading research, with attention to geography, genealogy, intellectual power structures, and the nature of the cultural transmission process.

Professor Dunnette defines fads as "those practices and concepts characterized by capriciousness and intense, but short-lived interest." In reading research we have several pretty clear examples of fads. The synaptic transmission model of explanation for reading difficulties, the early non-oral methods of McDade, square span, organismic age finger pacing, non-finger pacing, diagnosis only by means of eye-movement photography, and the post World War II emphasis on various quick-exposure techniques are examples of fads. Current practices or concepts which look to me like fads are such things as over-elaborate wringing out of data in sub-strata analyses, a belief in programmed instruction as a panacea, super-speed reading training (fad bucks for fad cats), teaching two-year olds to read, the efforts to recapitulate neurological development by creeping and crawling, and possibly the strong emphasis on a linguistic approach in instructional techniques. Only time will tell if these are true fads or if they are the advance warnings of true revolutions, as some of the aficionados would have us believe.

One of the primary problems with fads is that they tend to drain away a great deal of research energy into efforts which may not produce anything in the long run. Most of us are fond of saying that any idea is a good one if it generates new hypotheses and stimulates research. Unfortunately, that is true only if the new hypotheses and the resultant research are worthwhile. It is a little like the argument that a broken window is good for the economy because it puts people to work. What it really does is to lower the standard of living and retard progress because the work done does not add anything to the economy. So it is with silly or faddish ideas. They might keep a few research workers off the streets, but the chances of anything useful coming out are very slim.

The defense against being misled by glib or overly enthusiastic theorists is a solid background in the basic data which already exists in the sciences upon which reading research rests. For example, the super-speed reading fad was not very attractive to the people who had a good background in the basic research in vision, physiology of reading, and eye-movement research. The synaptic transmission hypothesis was not very attractive to people who knew enough about the nervous system from their general psychology background to realize that if a chemical imbalance at the synapse could alter transmission patterns enough to change reading behavior, it would make such sweeping changes in the organism's central nervous system as to make almost any organized behavior impossible, and that such symptoms would show up in every possible aspect of the reader's life.

Let's turn our attention to fashions in research. Dunnette (1) defines fashions as "Those manners or modes of action taking on the character of habits and enforced by social or scientific norms defining what constitutes 'the thing to do.'" It is important to note that fashions, unlike fads, are very often extremely useful. They are sometimes patterns of behavior that have become the thing to do because over the years they have been shown to have real utility. Some fashions in reading research are model-building, theorizing and theory-building, null hypothesis testing, statistical substitutes for experimental controls, treatment studies, and information retrieval systems. These are all potentially useful things, if they are done properly, and the fashions in both psychological and educational research have generally helped us rather than hurt us.

Folderol, on the other hand, is a negative influence. Dunnette (1) defines it as "Those practices characterized by excessive ornamentation, nonsensical and unnecessary actions, trifles, and essentially useless and wasteful fiddle-faddle." Under this heading I would put such things as grantsmanship, publication for the sake of publication, becoming fixated on a single technique or limited point of view, coining new and esoteric names for old concepts, and the repeated publication of research data which has already been widely distributed. A great deal of government money, journal pages, reader time, subscription money, and a few otherwise good reputations have been spent in folderol.

Some of the problems with folderol could be solved with a judicious tightening up of the controls that the academic community and the granting agencies have available. For example, if more granting agencies asked pointed questions about existing knowledge, practical utility, and research qualifications, a lot of folderol would stop immediately for lack of financial support. In other cases controls need to be exercised by ethical or moral persuasion. It needs to be more widely recognized that multiple publication of the same research without very strong reason is a crime against good taste, academic ethics, and good professional behavior. Journal editors and program chairmen can help in this regard by asking prospective authors or speakers to state whether or not the manuscript under consideration has been or will be submitted elsewhere.

So far our look at reading research from a sociological and anthropological point of view has produced a rather negative picture. Possibly if we turn our attention to the natural history of reading research, we will find more encouraging things. One interesting topic is the geography of research subjects, or interests. It would be very interesting if we could map the migration of ideas and research emphasis as we do the migration of birds. We start with the natural habitat. Ideas concerning mental content seem to be indigenous to central Michigan, especially Kalamazoo. The neurology species seems to have developed two separate strains, one identified with Don Smith at Michigan, and one indigenous to the suburbs of Philadelphia, surrounding the laboratory of Carl Delacato and Glenn Doman. Personality patterns are popular at Manhattan, Kansas, and Minneapolis. Sub-strata theory seems to thrive in the climatic conditions characteristic of California. We could go on with this geographical analysis, with testing centers at Minnesota, California, and Iowa, Cloze research at Texas Christian and Connecticut, Study Skills research at Ohio State and Buffalo, and Behaviorism at Minnesota. The point I want to make is that there are geographical strengths and weaknesses, and that a map of research activity would show two main effects. One is a heavy predisposition to do certain kinds of research in certain places. The other has to do with the uneven distribution of research activity itself. Some parts of the country are veritable beehives of research activity, and some areas seem to be rather barren and non-productive. If I were to carry the anthropologist role to its logical conclusion, I suppose we would have to postulate some causal relationship between climate and productivity, or between some other natural phenomenon and productivity. It just now occurs to me that research productivity is probably correlated with altitude in a negative way. We don't get much research out of the Rocky Mountains.

These explanations are, of course, silly and serve to demonstrate our total ignorance concerning the factors which go to produce successful research. A study of such factors might enable us to broaden the base of the whole enterprise.

Another interesting way of looking at the people and their productivity is in terms of genealogy This notion has to do with the question, Who was his teacher, or to put it another way, Who Did What to Whom? I remember that at one of the social hours at a National Reading Conference a group of us were playing the genealogy game one evening and I discovered to my surprise that in a certain sense I was the great grandchild of J. B. Stroud, whom I had just met for the first time. It seems that J. B. Stroud had begat Marvin Glock, now at Cornell. Marvin Glock had begat Don Smith, now at Michigan, and Don Smith was my major advisor. The reason I bring up this matter of genealogy is that I suspect that it is a major factor in determining the nature of the research done by a particular professional person. It has implications for hiring and selection procedures in universities. We have all seen, I'm sure, the results of excessive institutional inbreeding. It can only be avoided by the maintenance of a powerful taboo against incest.

The above discussion is to some extent relevant to the question, Where do ideas come from? The answer seems to be that they tend to be generated by close working relationships between colleagues and between teachers and students.

Let us now turn our attention to the question, Where do ideas go? Or, to put it another way, how are research findings circulated among other reading specialists? This question has recently been of interest to the members of the American Psychological Association, and some of the data will probably give us good information about how ideas get around in reading. In late 1961, the APA, with the support of the Office of Science Information Service of the National Science Foundation, initiated a Project for the Study of Scientific Info Exchange in Psychology. They were interested in developing a natural history of scientific information exchange in Psychology. I happened to be one of the subjects in the study, and was greatly impressed with the thoroughness of the questionnaire materials and the interview and follow-up techniques used. They took a sample of published studies in psychological journals and used information from the authors to trace the development of the research and its presentation to the profession. They found some very interesting things. For example, it turns out that it takes a long time for research to get done and into publication. (2:10)

The following times would be required from the start of research until it is reported in a professional journal according to the conclusions reached by Garvey and Griffith (2):

Time Prior to Publication	Stage
30-36 months	Research begins
18-21 months	Rather complete report can be made
15-18 months	Reporting of research starts to special interest groups
12-15 months	Oral report to national or regional meetings
9-12 months	Article submitted to journal (12 months additional delay if rejected)
Article published	
15 months after publication	Abstracted in publications such as *Psychological Abstracts*

In spite of the fact that the information in published materials is very old, we still have to deal with it. Let's take a look at what happens if we try to do a good job of information retrieval. I have some data on this subject as I am a member of the International Reading Association Abstracts and Information Retrieval Committee and have been given the job of exploring the possibility of an abstracts service or abstracts journal in reading. It looks as though such an enterprise would be a very large job. If we compare the existing abstracts journals with the field of reading, we find, for example, in a sample of all the *Psychological Abstracts* for 1963, that 537 journals were searched and abstracts were written by 456 different abstractors. *Psychological Abstracts* seems to operate with a full-time staff of one editor, one managing editor, one advertising manager, six editorial staff members, and four indexing staff members.

The *Education Index* was sampled between July 1, 1961 and June 30, 1963. They do not do abstracts, but did list a total of 208 journals. The staff seems to consist of one editor and two indexers.

Sociological Abstracts was sampled by taking two of the eight issues which came out in 1962. A survey of these issues suggests that they are probably searching about 200 journals, with a staff of eight full-time people, one editor, four assistant editors, one editorial assistant, one administrative assistant, one advertising director, and five regular editorial associates who are probably volunteers, and twenty-two subject field advisors who are also probably volunteers.

Chemical Abstracts are a good example of what happens if you try to cover all of the related literature on a world-wide basis. They search approximately 9,700 journals and use approximately 2,000 abstractors.

The above data gives some notion of the size of an abstracting enterprise in other fields. It looks as though the reading field would be of approximately the size of the *Sociological Abstracts*, and would require a search of approximately 200 journals. Just estimating the cost of central office salaries puts us between $50,000 and $100,000 without considering the cost of production, over-head, space, equipment, and location. The world-wide nature of the reading research enterprise would mean that it would make special demands on such an effort. It would mean that three to five professional people would need to commit the bulk of their professional lives to the gathering and publishing of reading research.

All of this in order to get three to five year old research available to colleagues who may have seen it already if they are actively concerned. It is no wonder that the individual professional person who tries to keep up with the research and reading has a very difficult time. I have what is probably an unusually well organized file of research studies in reading in the form of a cross-indexed card file of research studies. I have one student working about 15 hours a week maintaining this research file, and we are falling rapidly behind.

One possible way for the individual researcher to keep abreast of the current situation is to have some one person keep all of the existing research studies in a computer memory and have the computer print out the appropriate bibliographical entries upon demand. Dr. Edward Summers at Indiana University currently has a small grant from the United States Office of Education to explore the possibility of doing just that. If his plan works out, it will be possible to send him a few dollars and the names of the variables about which one wants to do research. He would then request of the computer that it print out all of the articles in which those terms appeared in the tiltes.

As I see it, there are two major shortcomings of such a system. One is that it is rather difficult to specify the particular terms that constitute the research that one is interested in. The other difficulty is of course the time lag. One would have to send the appropriate search information to Indiana University and then wait for the computer to spew out the appropriate studies and then wait again while such information was mailed back to the inquirer.

Obviously, there is no simple answer to the problem of dissemination of research information. However, it seems to this writer that there are some things that we can do which would be of great help. The following are some of the ideas which come out of a perusal of the APA report and the experience of the writer:

1. Increase the amount of informal information transmission among reading specialists. The APA report indicates that in many cases research results are transmitted by word of mouth, through small meetings, colloqueum discussions on campuses, and personal correspondence. We need to develop ways for such informal exchange.

2. Informal discussions at conferences. My experience suggests to me that the most valuable aspect of a conference such as the National Reading Conference is the evening social hour in which it is possible to find out what other people are doing at other institutions that they do not yet have ready for a formal report. Unscheduled times at conventions often turn out to be more productive of information exchange than do formal presentations.

3. More small interest groups like the National Reading Conference. In the last few years a number of small and informal professional organizations have sprung up in the reading business, such as the National Reading Conference, the College Reading Association, and the North Central College and Adult Reading Association. These groups provide opportunities for professional people in reading to get together and interact on an informal basis.

4. Increased information dissemination function of journals. Judging from the APA report, about 1% of the people vitally interested in a particular piece of research, learn about it by reading a research article in a journal. Most of them have heard about it before that time.

This suggests that we might change the nature of journals so that they would have a maximum of brief, quickly published reports and abstracts. One step in this direction would be to develop in each of our reading journals a section dedicated to reporting on-going research and/or brief reports of recently completed research.

5. Formalizing the current information communications by mail. One acquaintance has volunteered to be an information retrieval and dissemination center for a certain area of research in psychology. He has the names of a large number of professional colleagues who would like to hear about on-going research in a certain small number of interest areas in psychology. Colleagues write to him telling him the areas in which they would like to receive papers, and others send him their reprints to be disseminated. This system, of course, calls for a great deal of social service drive on the part of such an information center. However, it is an extremely valuable service. It is the sort of service that B. F. Skinner was providing for a while on research relating to programmed instruction. That began simply because people interested in programming tended to write to Skinner and he became a natural center for information. Considering the geographical nature of reading research as mentioned earlier in this paper, it might seem that such a system would work very well on those kinds of reading research that are readily identified with a particular locale.

6. Exchange graduate scolars. Considering the success of exchange scholar agreements with other countries, it seems reasonable that such an arrangement might work very well for graduate students in reading. For example, a student at one institution wanting to do research in an area emphasized by some other institution might maintain registration with his major advisor, but work under the actual direction of a researcher in another institution. This happened at Minnesota recently when a graduate student at another university decided to do a thesis at Minnesota. This has worked out very well and the cultural shock involved has been good for the student and the faculty members involved.

In conclusion, we need to know more about the natural history of reading research, the geography involved, the genealogy of intellectual power structures, the flow of information from one professional person to another. An armchair analysis like this paper is not enough—it only points the way. We need good solid empirical studies of influencers and information transmission. In addition, we need more channels for the immediate flow of information to avoid the three to five year lag in information exchange. For a field that is more than 2000 years old, we have done very little about learning to communicate with each other. Maybe the next 2000 years will be better.

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Toward the Generalization of the Substrata-Factor Theory to Include a Deterministic-Nondeterministic Learning Theory

Jack A. Holmes
University of California, Berkeley

The question is, *why* do people differ in their ability to read? In more scientific terms, *what* are the underlying variables which cause one student to excel another in the speed and in the power with which he is able to read? And *how* do the dynamics of the mind organize the underlying variables to accomplish this? *How* do they learn to read in the first place?

NATURE OF THE SUBSTRATA THEORY

Until now, the Substrata-Factor Theory has been a *performance* theory. It has been concerned with searching out and quantifying the contributions which relevant substrata factors make to individual differences in reading *after* reading and its underlying abilities have been acquired. It might also have been described as a *content* theory, since it has been concerned with the mental content and the mental *structure* making for individual differences in performance.

NATURE OF PROPOSED ENLARGEMENT OF THE THEORY

In keeping with the purpose of this symposium, which was indeed a challenge, the writer proposes to do three things: (1) review a few concepts basic to the Substrata-Factor Theory, (2) draw from this theory, anchored as it is in classroom achievement, what appears to be a powerful hypothesis which may go a long ways toward explaining the emergence of *purposive behavior* from *deterministic learning,* and (3) sketch in some implications of this new integrated theory for future research and teaching.

REVIEW OF MAJOR CONCEPTS IN THE THEORY

The Substrata-Factor Theory holds that normally, reading is an audio-visual verbal processing skill of symbolic reasoning. On the psychological level, this processing skill of decoding and reasoning from visual-verbal symbols is sustained by the *interfacilitation* of a *dynamic working system* of *substrata factors.* Further, interfacilitation among the factors is optimum when the reader subconsciously *mobilizes* the most appropriate factors into his characteristic reading *working system* hierarchy (Holmes 9, 17, 23); (Holmes and Singer 19, 26); (Kling 31); and (Singer 42).[1]

Under normal conditions this working system is pressed into service in accordance with the reader's immediate *purpose* and deep-seated *value system*. It is assumed that a functionally optimum hierarchy will be relatively stable because it will tend to mobilize a minimal number of highly related and complex substrata factors, such as vocabulary, verbal analogy, word sense, etc. However, when the need arises because the habitually utilized hierarchy becomes inadequate, the working system is enlarged to incorporate those substrata factors which would allow a more penetrating type of analysis. The necessary discriminations for the more minute analysis may now call for detailed comparison and contrast which utilize information stored in *less* complex abilities such as spelling, prefixes, suffixes, roots, phonics, syllabication, etc. On the other hand, a student may be frustrated because he lacks the information and the *more* complex insights which are prerequisite to understanding the logical development of concepts in his text. When the student is reading well, he reads by mobilizing a characteristic working system of subabilities. But whenever the smooth and rapid intake, interpretation, and understanding of symbolic material is interrupted because of too abstract content, strange word order, complex structure, blurs and misprints, or lack of experience with a specific word, phrase, or idea then the student slows down or rereads in an effort to resolve the confusion. In such a *re*analysis he consciously or subconsciously strives to change his mental-set. But a change in mental-set signifies a change in the strategy of attack.

From the theory, the hypothesis is drawn that such a shift to a more appropriate mental-set is tantamount to a recognition of the reader's working system to include those substrata factors most likely to help in resolving the immediate difficulty that confronts him. The theory assumes that the mind-brain contraplex is composed of a cosmos of ability systems. An ability is a system of subsystem associations. Subabilities are compounded from microsystems of tiny engram-assemblies of the cortical cells themselves wherein the informational bits making up the end elements of associations are stored. Biochemical concentrations and balance may very well, however, control the neurofunctional efficiency of the system or subsystem at the cell body, the dendrites, or at the synapse level. (Hebb 6, Smith 50).

The theory further assumes that (a) because the nervous system itself is constructed in hierarchies (Holmes 25), and (b) because the formation of all concepts must be constructed on an edifice of prior learning (Gagne' 5), the most logical *structure* for the interdependencies of such ability-systems, when mobilized for *purposeful* action, is that of a functional hierarchy (Holmes 7, 8, 11). In fact, a functional hierarchy seems a neuro-engineering necessity in such a complicated process as reading, for without such an integrating and focusing structural organization the richness of the cortical connections would make inevitable psychoneurological jamming of the cerebral system at each stimulus-response episode. That is, there must be some inhibitory mechanism to keep all the facilitory mechanisms of thought under control as reciprocal innervation (Sherrington 41) keeps antagonistic and protagonistic muscles working together in harmony (See Davis 2, 3, 4).

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[1] The Program Chairman originally requested that I cover "The Substrata-Factor Theory of Reading from 1948-1965." Therefore, the references included in this paper are general, extended, and sometimes tangential in an attempt to bring together for the reader as complete a bibliography as possible.

While the theory assumes that the mind-brain contraplex is composed of a suprasystem of ability-systems, a *substrata factor* is a technical term used to designate a specific ability-system that has been momentarily selected and integrated into a particular working system. Since the theory holds that the *same* elemental information with *different* associations gets deposited in many cells and becomes differentially connected by cell assemblies in many *different* areas of the brain, there is no need to posit the overlapping of identical and independent elements to account for the correlation between tests. Each ability-system is, to some degree, an organized body of knowledge and can act with a functional integrity on all other systems. Thus the information in an ability-system is given a cohesion by the belongingness of the categories of information and by the internal logic of the cognitive concept hierarchies into which the basic constituents have been structured (Holmes 25).

Psychometrically then, the theory assumes that an ideal test is composed of graded items representatively chosen to sample a range of a specific domain. A student's score is the number of items correctly answered. Therefore, each total score is a function of the conjoined and interdependent subsystems preferentially structured within the mind of the student and called upon by him to attempt to answer each item. This process is assessed as his ability.

THE DETERMINISTIC-PURPOSIVE BEHAVIOR LEARNING THEORY

The Substrata-Factor Theory, as expounded to date, is expressed in the humanistic terms of purposive behavior. However, the S-R, R-R, etc. experimental evidence makes it very clear that somehow what is observed and intuitively felt as purposive behavior must be anchored in and derived from associations initially learned by the process of conditioning. This section will suggest a hypothesis that explains how this transformation from essentially deterministic to purposive behavior might come about. As an example, reading will be used as the ability to be learned, but the theory is a generalized statement.

Each substrata factor, working within an individual's reading hierarchy, is a relatively contained system of associations which are built up over a period of time by the compounding of multiple cognitive concept hierarchies. These cognitive concept hierarchies subsume the word association structures and word association chains which have become semantically generalized into ordered systems of special and temporal verbal-habit-family-hierarchies. There is sufficient evidence (51)[2] to suggest that verbal-habit-family hierarchies are operantly conditioned. In the beginning discriminations and differentiations are made possible by the various sense modalities; then, words become associated with meaningful concepts by reinforcement derived from the multifacet verification of their object realities from personal and social satisfaction and dissatisfaction.

But these verbal-habit-family hierarchies multiply and soon the child has essentially all those conditioned associations necessary to allow him to read fluently and meaningfully all the words in his speaking vocabulary. Nevertheless, as long as he remains reading at this level of difficulty, as long as the reading text presents only words or ideas not already in his repertoire, at best he can be credited as still *learning to read*.

There comes a time, however, when the material presents brand new concepts and, what's more, it couches these concepts in words which are unfamiliar to the student—at this point he begins to *read to learn* (Holmes 21). At this point the activity of the mind-brain contraplex takes on a new dimension in relation to reading. In order for the student to continually understand what he is reading he must decode the new words and mentally manipulate the new concepts so that they bear a meaningful relationship to what he has previously learned. To successfully do this his mind-brain contraplex must search for those essential connections that will link the new concept not only to earlier stored information, but also to those prerequisite concepts recently acquired from the previous pages in the textbook. That is, as the new material accrues he begins to understand its concepts to the extent that he is able to logically incorporate them into his developing subject-matter hierarchy. But more important, at the time of decoding the visual symbols, the mind-brain contraplex must be stimulated by the associative logic of the sequential input toward a higher type of conceptualizing activity than has been previously necessary (Holmes 17).

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[2] See Singer's (1965) cogent reply to Staats's "Integrated Functional Learning Theory for Reading." The present paper, in a sense, is an attempt to overcome Singer's criticisms of the Staats' model, and at the same time to detail the dynamics which lead from S-R learning through mediational systems to cognitive concept hierarchies, free choice, and purposive behavior. The telling point made by Singer is as follows: "Of course, S-R theory can explain how individuals can learn to discriminate, abstract, and generalize, but S-R theory cannot predict the formation of conceptual systems. However, if the cognitive capabilities of the human learner were added so that the theory would be an explicitly formulated Stimulus-Organism-Response model, then hypotheses could be derived and tested to determine the conditions under which the cognitive capabilities of the learner can be developed into an adequate system for handling the mass of detailed information that is necessary for responding accurately and meaningfully to printed words."

The change from *learning to read* to *reading to learn* makes necessary a mobilization activity that involves a process several orders of magnitude higher than the initial operant conditioning process utilized in learning to read. Here, then, is where the substrata-factor theory introduces into operant conditioning what is taken to be a new hypothesis that is both necessary and sufficient to transform an *operantly conditioned* organism into a thinking individual capable of exhibiting *free will* in choice and *purposive behavior*. The theory postulates that as an individual becomes conditioned, with differing intensities to several sets of value associations, a loose hierarchical value system begins to shape up and tends to come to focus in what the theory terms mobilizers (Holmes 12, 16, 18).

MOBILIZERS

Mobilizers function to select from one's repertoire of subabilities those substrata factors which minimize one's chances of solving a specific problem in particular, and forwarding the realization of self-fulfillment in general. Neurologically, mobilizers may be conceptualized as those electrochemical biases in the brain which control scanning-search mechanisms that enable it to select and momentarily tie into a cerebral pattern of communication those substrata factors most appropriate to the task at hand.

Moreover, mobilizers must exert a major influence as the focus of the fundamental driving value systems from whence spring the many and specific attitudes and anxieties a person holds toward the purpose and worth (a) of life and death, (b) of the spiritual, social, biological, and physical nature of the universe, and (c) of the self's expanding personality. Consequent patterns of behavior are directed by such value-patterns (Athey 1, Holmes 17).

As indicated above, the shifting from *learning to read* to *reading to learn* necessitates the development and utilization of a higher order mental process. Specifically, man has learned to manipulate the behavior of other human beings as well as animals by operant conditioning; and therefore, the substrata-factor theory hypothesis that then man can also learn to condition his own mind-brain contraplex, and thereby, to a certain extent, he is able to direct his own behavior at will. Once the value of a certain style of behavior becomes dominant in one's value system hierarchy, then mobilizers proceed to organize the mind so that the individual may systematically engage in the value-linked activities.

THE MODUS OPERANDI

As an illustration of the modus operandi, a student reads a passage containing a concept he doesn't quite understand. At this point he engages in the reasoning process associated with *reading to learn;* he actively searches the diverse content of his mind's substrata factors for a second concept which he vaguely feels he has come in contact with in the past but can't remember when, nor where, nor does it seem possible to recall it at the moment; yet, the trace is there, and he feels he *needs* it. That, somehow, if he could recall it, it would help him to better understand a new concept he has just come upon in his reading. Mobilizers direct the search until the vaguely felt second concept is found and paired with the new one. If the new covert association does not meet with the validity criterion of his logic, then another search is initiated to find a third concept which can be used to modify the second concept into an acceptable form for completing the originally desired association that will allow him to better understand the new concept. Now the formation of this brand new concept, derived from the coupling of the primary and modified secondary concepts, takes its place in the enlarging—but more integrated—hierarchy of the subject matter discipline. Further, not only are the associations of the new concept reinforced, but *the searching process itself is reinforced,* since the activity resolves a problem and furthers his purpose. This, it is suggested, is the prototype of the process that we refer to when we allude to reading as reasoning (Holmes 7, 10, 11). And on a little higher plane, this same type of cerebral activity must constitute the parameters of creative thinking (Holmes 20, 22). The bridge to such covert activity, indeed, would be a very difficult step to manipulate—nay, it would be impossible—if it were not for the fact that (1) the neurological structure of the brain has evolved this potential in accordance with the natural laws that govern the unity of the universe; i.e., with the tendency of the nervous system to organize segregated wholes, in the Gestalt sense, in accord with the physical objects along with an inborn *predisposition* of the mind-brain contraplex to search for and identify patterns in keeping with experience, (2) the child has already had a great deal of non-reading experience in discovering how to shape-up his mind, and (3) the increase in the rate and level of difficulty of the reading material presented to his has been carefully graded.

The substrata-factor theory holds that the individual, to some extent, controls his own actions toward purposive behavior. However, classical and operant conditioning form the foundations from which emerge free choice and purposive behavior. The integrating hypothesis, generated from the substrata-factor theory, explains the dynamics in the following way: Out of the operant conditioning of a multifocused system of conflicting values, and out of the behavior perceived as appropriate to these values, arise an opportunity for what Tolman (52) in a different context, referred to as the vicarious "running back and forth" over the general possibilities before taking action. That is, the shaping up of a value system containing several conflicting concept hierarchies of essentially *equal* strength sooner or later presents a choice situation preparatory to action.

The mental running back and forth over the several conditioned action-possibilities, and the comparative weighing of these in terms of their expected immediate and long range outcomes contain the essence of reasoning. Within such a decision there appears to rest the essence of free choice, and the decided upon action, if it follows, is purposive behavior.

A "pure" behaviorist may argue that the scales, in weighing the choices, will always be tipped in the direction of that choice which, in the past, has been most strongly conditioned. But this argument does not hold because man has the ability to put "two and two together" and imagine what the outcome will be.

When man has assumed a mental set of serious reflection, then his "running back and forth" over the possibilities and his imagining of what *might* lead to what (See Tolman 52) can offset the preconditioned advantage one choice may initially have had over the other. This is possible for at least two reasons: (1) Much of what a man knows is derived from observation and vicarious experiences in which he was not directly involved. Therefore, such associations cannot be strongly conditioned to *his* actions, yet, this information is stored within his hierarchies and may be drawn upon in imagining the outcomes of the various possible lines of actions he may take. (2) Though the brain is predisposed to learning through conditioning, evolution has equipped the human brain with a neural structure so that it is also superbly predisposed to and equipped for resolving conflicting lines of conditioned action by recalling such information as indicated above in (1) and also, as previously explained, by *generating new needed* insights from his experiences.

Obviously, the above has been oversimplified, for the mind-brain contraplex and its relation to learning and action is a fantastically complicated affair. Nevertheless, the essence of the dynamics involved in the hypothesized shift, which explains how the child evolves from a conditioned organism to a thinking individual confronted with free choice and purposive behavior, has been spelled out. But it must be realized that *this is a gradient shift and is much more gradual than has been indicated.* Early in the child's life, he is confronted with many small conflicts of interest upon which he must make decisions. These will be made first in one direction and then in another, and these prototype experiences form the bases of his developing ability to reason. To a degree, the child is aware of and can remember the mental manipulations by which he arrived at such decisions. Hence, the environmentally contrived experiences of childhood in the home and school are important, for the success of these remembered manipulations may be thought of as reinforcers in conditioning his ability to reason. However, since innate differences in the neurochemical structure of childrens' brains vary, there will be differences in their abilities to perform this function, even though they were all conditioned exactly alike in this regard. It is the gradual nature of this shift that explains why the theory relates the hypothesis of the gradient shift (1) in the cognitive processes and (2) in the substrata factor content to the developing ability to read with speed and power (Holmes 8, 9; Laycock 34, 35, 36, 37, 38; Singer 45, 46, 48, 49).

GRADIENT SHIFT

Another aspect of the *gradient shift* hypothesis, derived from the substrata-factor theory, is the geneticoenvironmentally determined *preferred modalities* of (1) input and (2) mediation (Holmes 11, 14, 15, 21; Kyme 32; Lamy 35), and output.

An infant is essentially a tactile, kinesthetic, and pain receiving organism; nothing he sees or hears can make much sense to him. His initial associations with objects are centered in the somatesthetic and pain areas of the brain. It is to these sensations that he makes his first responses which, like the sensations, are diffused and ill defined. Maturation, his own explorations, and especially the fondling of his mother soon increase the specificity of these sensations and their responses.

Thus, the tactile-kinesthetic-pain areas of the brain soon become established as criterion centers for object-reality. In a sense, sensations received by the auditory and visual areas of the brain are given reality or meaning by intercortical associations with these basic criterion centers. However, before long the child is hearing and seeing things which he can't handle, and at this stage these things cannot mean much to him. Slowly he becomes conditioned to his own body's schema and to his orientation in space. These associations involve a particularly fundamental type of conditioning because the child is born neurologically "wired" for these discriminations in the sense that each part of the body is genetically committed to a specific area in the brain.

Nevertheless, he must first establish the basic associations which differentiate and relate meaning to the various parts of the body within the mind-brain contraplex. Then he must begin to associate the "proper" *names* with the parts of his body and at the same time begin to project from them his directional concepts (up, down, right, left, front, back) toward the outer world so that he may orient things in

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space *to* himself. This process progresses in concept elaboration until verification of object-reality becomes a mutual affair in which each modality contributes to the overall object-concept. Nevertheless the somatesthetic areas continue to function as a "touch-stone" for object-reality verifications.

VERBAL MEDIATORS

When the *child begins* to talk, these somatesthetic areas and the uncommitted area (Penfield 39) of the cortex begin to form the necessary neurological connections and psychological associations to shape up his command of the language. But as the educative process really begins to take hold, the child is required to associate meaning to abstract *visual* symbols representing abstract *auditory* symbols which, in turn, represent *pictures* of objects which the child must *handle* to know. And so one of the developmental tasks the school must present to the tactile-kinesthetically minded child is a problem enriched environment demanding auditory-verbal, visual-*verbal*, and manipulatory-*verbal* responses to multifaceted stimuli objects. If the concepts he is forming are to have much meaning, then actual object "touch stones" must be present. Although first hand experience is basic, experience talked about by the child himself makes for a better learning situation (Holmes 9, 24; Jensen 27, 28, 29; Jensen & Rohwer 30; Rohwer 40).

The substrata-factor theory hypothesizes that one need not habitually mediate or think in the same modality that he prefers to use as his input channel (Holmes, 20, 21, 25). A person may prefer *listening* to reading as a way of gaining information, but once, informed, he may tend to mediate his own ideas by associating what he has heard with strong *visual* images. Another person who also prefers listening to reading may mediate his concepts by the subarticulation of the language itself. One person could use the "mind's eye," another the "mind's ear," while another may "feel" himself into a situation. Another individual must subarticulate his thoughts in words; yet others do high level thinking by manipulating abstract concepts which do not appear to be strongly associated with any kind of auditory or visual images or with subarticulated feelings but only with a vague sense of knowing.

Therefore, there are great individual differences in the modalities by which people are predisposed; first, to accept information, and second, to process this information and third to transmit the processed information. Childrens' preferred modalities are different, and these differences under particular circumstances must be taken into consideration when they are being taught. For the majority of children in the center of the normal distribution in our schools, learning is a multimodal process. Therefore, teachers need not be too concerned with the preferential modalities of their students. If, however, a child develops trouble in his reading, the discovery of that child's preferred input and mediating modalities is absolutely essential for his proper diagnoses (Holmes 23) and in order that he may be taught those substrata factors in which he shows deficiencies (Trione 53).

IMPLICATIONS OF THE THEORY FOR FUTURE RESEARCH AND TEACHING

As far as the *performance* and *content* aspects of the substrata-factor theory are concerned, the first research need is replication of the basic experiments listed in the *bibliography*. A better program would be a replication of experiments which take into consideration findings from previous experiments that have tested hypotheses generated from the substrata-factor theory.

A second research need is for longitudinal studies in which only specific substrata factors are experimentally manipulated while others are held constant. This must be done, for a theory, in the last analysis, cannot depend upon correlational analysis for verification. In order to pin down cause to effect relationships, the experimenter must effect a change in the dependent variable in the direction predicted (based upon previous substrata correlational analyses) by systematically manipulating the independent variable (s) under consideration while holding all other relevant variables constant. Although this is yet to be accomplished, numerous substrata analyses already make it clear exactly which variables (out of hundreds) are to be either manipulated or controlled. Such experiments must be repeated at the separate grade levels. Mutual and unilateral cause and effect relationships should be similarly studied.

A third important area for investigation is the developmental nature of preferential modalities as they function in the input, mediation, and output of stimuli, cognition, and response. For these studies large samples must be selected in pre-kindergarten so that there will still be a statistically satisfactory number of the same students available for study at the close of the high school period.

A fourth area of research should seek to determine the content and structural differences in the working systems mobilized for the same reading tasks by culturally advantaged and culturally disadvantaged children.

It has already been suggested that differences in the value systems of the two groups will turn out to be the key which determines the variations in content systematically accrued and integrated into their respective reading working systems. But who knows until the experiment is performed? Greater understanding of the comparative need of the culturally deprived could result from a series of such studies.

A fifth area of study, involving the new *substrata-factor theory of learning*, should concern itself with deliberately contriving developmental experiences. These experiences would be used to test the hypothesis that such conditioning could shape up cognitive concept hierarchies in an experimental group to enable it to make more cogent choices and to pursue more purposive behavior than that pursued by a control group.

A sixth area for research is the utilization of the new learning theory to generate hypotheses regarding programmed instruction.

A seventh area opened for intensive investigation is in the field of simulation. The integrated *substrata-factor theory of learning and performance* immediately suggest guide line hypotheses on how digital computers might be programmed to simulate the development of situations calling for "free" choice in decision making. Further, the relationship of decisions to the nature and to amount of content and structure might be studied through simulation techniques. In fact, value system hierarchies may be structured in the program in order to simulate the scanning search and seizure process of the mobilizers. Finally, simulation of the generation of new and covert "ideas" within the computer, along with their validity testing for logical coherence, may be investigated.

CONCLUSION

1. Not all, but a number of fundamental concepts embodied in substrata-factor theory have been elucidated. To date, the theory has been concerned with performance, content, and structure. The rationale might be stated thuswise; no matter how a person learned, how he reads must be explained in terms of what he had learned.

2. From the substrata-factor theory a hypothesis was generated to explain how cognitive concept hierarchies, *free will* in choice and truly purposive behavior might be forced to emerge by operantly conditioning equal strength choices involving conflicts of interest. The process was illustrated by showing what apparently happens when a child goes from learning to read to reading to learn. The point was made that when operant conditioning is imposed on a human brain, it is imposed on an organ that has evolved a neurological structure capable of organizing wholes into meaningful patterns beyond that contained in the parts.

3. Seven new areas for further research were indicated.

4. Finally, man's basic intellectual curiosity and spiritual wonderment regarding the Universe seem to be at the very roots of his need and drive to evolve a system of values.

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Conceptualization in Learning to Read

Harry Singer
University of California, Riverside

Children have learned to read by means of a wide variety of methods and materials. During the history of American reading instruction (Smith, 71), the unit of initial instructional emphasis has varied by increasing in a surprisingly systematic way from the letter (alphabet method) to word parts (phonic method) to the whole word (word method) and finally to the sentence and paragraph (language arts method).[1] But, there is still only a paucity of knowledge about how children actually do learn to read (MacKinnon, 52).

However, it is known that regardless of any of the strategies that have been employed for teaching reading, the average pupil in progressing through the grades does cumulatively learn to recognize words that have not been specifically taught. That is, the pupil develops general word recognition ability, the ability to transform printed stimuli into mental processes so that meaning can be associated with these stimuli. For example, even though the basal reader method emphasizes the development of a sight word vocabulary, pupils recognize at successively higher grade levels an increasingly greater percentage of words than those to which they have been systematically exposed (Gates, 23). Apparently, experience in supplemental reading and the developmental word recognition lessons of the basal reader have been successful in teaching pupils more than just the correspondence among the seen, heard, and spoken words when they are learning to read orally by means of the controlled basal reader vocabulary. In fact, scrutiny of the lesson plans in the teacher's manual which accompanies the basal reader reveals that pupils are explicitly taught to abstract and generalize recurring word parts, such as initial consonants, blends, phonograms, syllables, and affixes. Consequently, either by instructional design or by utlizing their own learning "strategies" (Bruner, et al, 8), pupils could thus acquire a mediational response system for selecting, perceiving, and processing printed verbal stimuli. The symbolic responses or concepts in this mediational response system can then be mobilized in varying combinations for recognizing many more printed words than those employed in the original formation of the mediational response system. Since the pupil would not need to develop a separate mediational response for each printed word that he can recognize, the possibility of "cognitive strain" would be reduced (Bruner, et al., 8). Of course, if the formation of a conceptualized mediational response system is not attained, then the pupil's rate of learning to recognize words would be relatively slow because he would be limited to recognition of just those words for which he had developed specific responses.

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[1] Such a wide range of approaches to teaching reading in the first grade now exists that recently 27 somewhat different studies at this grade level were supported by the U.S. Office of Education at a total cost of approximately $600,000 (Durrell, 16).

Whether reading is taught through a basal reader method or through some other method, a complex conceptual system and mental organization would have to be postulated to explain how individuals do learn to read. Because there are many factors which enter into the development of general reading ability (Holmes, 30, 32, 35; Holmes and Singer, 36, 37, 38; Singer, 66), each method of teaching reading can be relatively successful because it stresses one or another of the many variables that are related to attainment of speed and power of reading (Holmes, 32). However, all the necessary elements for reading are present in the materials employed by each method so that pupils in learning to read through any of these methods could have used their capabilities for selecting their own unit of perception, their own conceptualized mediational response systems, and developed their own mental organization for attaining speed and power of reading (Holmes and Singer, 36; Singer, 63, 66). Probably the acquisition of such response systems could be facilitated by an instructional strategy which capitalizes upon the cognitive capabilities of the learner (Singer, 67).

SOME RELATED RESEARCH

Although many factors have to be postulated in order to account adequately for the attainment of reading behavior, the formation and use of concepts are, in fact, related to a significant portion of the variance in each subsystem of reading (Singer, 63, 64). From the many studies on conceptualization and the relationship between conceptualization and reading ability, which have been reviewed elsewhere (Singer, 63), only one investigation that is quite germane to a theoretical formulation of the role of conceptualization in learning to read will be reviewed again in this paper. Also, two more recent reports on the relationship between conceptual ability and reading achievement will be summarized.

Capacity for conceptualization was specifically related to reading achievement by Kress (43). After matching 25 pairs of children who were between the ages of 8 and 11, above average in intelligence and comparable on all subscales except the Similarities subscale of the Wechsler-Bellevue Intelligence Test, but who were significantly different on a word recognition test and the Stanford Achievement Test (Paragraph Meaning), Kress administered to each subject a battery of clinical tests of concept formation, which included the Goldstein-Scheerer, the Hanfmann-Kasanin, and the Wisconsin Card Sorting

Tests. Responses to the WISC Similarities test were scored for concrete, functional, and abstract levels. Kress summarized the results of these concept formation tasks by stating that in contrast to the "achieving readers," the "non-readers" tend to lack (a) versatility and flexibility, (b) originality in establishing suitable hypotheses for testing, (c) initiative for exhausting all solutions, (d) persistence in problem solving under changing conditions, (e) ability to draw inferences from relevant clues, (f) ability to shift set when new standards are introduced, (g) ability to analyze the factors present, (h) adequate labels for common concepts and (i) adequate concepts for dealing with language. On the other hand, the non-readers tend to exhibit (a) a tendency to cling to previous acceptable solutions, (b) an abnormal need for success and avoidance of failure, (c) a dependence on the physical characteristics of the objects, and (d) a tendency to be more concrete and less abstract in conceptual functioning.

Jan-Tausch (41) also concluded that "retarded readers are retarded because of limitations to concrete thinking," but he conceded that other causes of reading retardation, such as poor vision, hearing, ego development, and instruction could be inferred from his data.

Recently, Robinson (60) hypothesized that rigidity in perception and conceptualization might be an important factor in reading retardation. She suggested that while most individuals are flexible in perceptual and conceptual modes, some pupils might rely mainly upon a single perceptual and conceptual style which, if non-modifiable, would require adaptation of instructional methods in order for these pupils to be successful in learning to read.

The evidence clearly indicates that there is a relation between conceptualization and learning to read, which is usually not a function of the method of teaching reading. Therefore, any theory which purports to explain how individuals learn to read would need to state explicitly the way in which the formation and use of concepts might enter into the development and dynamics of general reading ability. The following is an attempt at such a theoretical formulation. Also, an attempt will be made to integrate this theoretical formulation with the substrata-factor theory of reading.

CONCEPTUAL ABILITY IN THE SUBSTRATA-FACTOR THEORY OF READING

In the process of learning to read, an individual develops and utilizes his ability to select and organize symbolic stimuli into perceptual units. Through conceptualization, the process of discriminating, abstracting, generalizing and organizing common elements (Hull, 39), relationships (Smoke, 72), or crucial aspects of a complex figure (Osgood, 56), an individual reduces a variety of stimuii into fewer categories, which simplify and facilitate his learning task by easing the "cognitive strain" (Bruner, et al., 8). Gradually he thereby builds up a conceptual-readiness (Leeper, 48; Russell, 61; Vinacke, 75) to respond to stimuli with a symbolic mode of reaction (Heidbreder, 29) or mediated response (Osgood, 56; Morris, 53). The concept that is formed could vary in span (Zaslow, 78), consistency (Reed, 58), or level of generality (Hanfmann and Kasanin, 26; Goldstein, et al., 25; Reichard, et al., 59; Zaslow, 78). These categories are internally linked together into a hierarchical system (Long and Welch, 49, 50) which enables an individual to organize broader units of response on a higher-order conceptual level and through such a superordination process to synthesize disparate elements (Bruner and Oliver, 10). An individual can then utilize this hierarchical system to select and respond to a perceptual unit. Through this circularity of perceptual processes and conceptualization, reinforced by successful practice, a coherent and flexible system develops, in which all the parts—when the individual attains maturity—psychosynchromesh as the individual compounds and recompounds them into working systems. These working systems are momentary organizations to meet the demands of the task-stimuli of the reading material and the reader's purpose (Holmes, 31). Thus, an individual acquires the ability to transform printed symbols into a complex of mental processes, known as his *word-recognition-substrata,* to which meaning can be associated.

If an individual lacks the capacity to conceptualize because of brain damage (Goldstein, et al., 25; Nielsen, 55; Werner and Garrison, 76), personality disorganization (Cameron, 12), or if his level of conceptual capability is inadequate at the time of instruction (Barnard, 3; Kress, 43; Piaget, 57; and Zaslow, 78), then the stimuli of the printed page during the process of learning to read may not be merged into concepts but remain a "succession of objects like beads on a string" (Russell and Groff, 62). Furthermore, if a teacher believes that early reading experiences consist of acquiring "mechanics" of reading, then the teacher may aim to develop this ability by calling upon memorization, rather than higher thought processes (Gans, 19), but if a teacher does stress conceptualization by grouping stimuli into common elements, pupils will tend to attain greater transfer (Gates, 20); or, despite the organization of instruction, pupils who have the capability may still achieve the necessary generalizations (Carroll, 13, 14).

Concomitantly with the development of a word-recognition-substrata, an individual learns to associate meanings, the residuals of his experiences with the referents of the symbolic stimuli, to the transformation of the printed symbols. These associations are fused or arranged into thought sequences and integrated into a broader working system of symbolic reasoning. If a communications network is developmentally established and integrated, then there can be cumulative transfer of meaning from the kinesthetic to the auditory and the visual modalities (Holmes, 33). Consequently, a conceptual system could be formed by selecting and interrelating meanings across these modalities. Then, this conceptual system could be mobilized for responding to stimulus input through the kinesthetic, auditory, or visual modalities (Singer, 63; Singer and Balow, 70).[2]

Defined from the above theoretical analysis, reading is a processsing skill that consists of (a) transformation of printed stimuli into a word-recognition-substrata, (b) association of meaning to the transformed stimuli, (c) synchromeshing of (a) and (b) into a harmonious working system. This working system is a momentary organization of substrata processes that is controlled by the demands of the task-stimuli, the individual's level of maturity in reading, his purposes, his values (Holmes, 34; Athey, 2), and his biological support system (Davis, 15). Thus, through a succession of working systems, the individual is able to attain speed, comprehension, and power in reading. Interference, faulty functioning, or failure in any of the above subsystems, (a), (b), or (c), serves to reduce achievement in speed and/or power of reading.

The remainder of this paper will be divided into three sections to explain in greater detail how conceptualization may operate in the interrelated subsystems of (1) word recognition, (2) word meaning, and (3) reasoning-in-context. In each of these broadly defined subsystems of general reading ability, flexibility in conceptualization will also be explicated.

WORD RECOGNITION

In the early stages of learning, the individual is confronted with a wealth of unfamiliar details which require fine discriminations for consequent perceptual accuracy and conceptual adequacy. Errors in responses to words at this primary level of development can often be attributed to perceptual immaturity, inadequate functioning of perceptual processes, incompletely developed word recognition concepts, or some combination of these factors. For example, a child may not be able to discriminate the fine differences between "e" and "o," especially when these letters occur in the middle of a word and have to be discriminated from the other letters, as well as from each other, as in the words *"net"* and *"not."* Or he may not have a correct kinesthetic or orientational concept of the so-called reversal letters of "b," "d," "p," "q," "u," and "n." Further errors may result from inadequate auditory discrimination of vowels, as in *"pan" and "pin,"* in which the slight change in pitch may not reach the level of awareness for some children.

The kinds of errors and their frequencies might not only arise from determinants within the individual, but also from interaction

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[2] Bruner's (9) identification of enactive, iconic, and symbolic modes of representation is similar to the above formulation of kinesthetic, auditory, and conceptual modalities.

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between these determinants and the method of instruction (Bond, 5; Fendrick, 18). If an individual with a sensory deficiency is exposed to a method of instruction which requires proficiency in that same sensory mode but is not able to compensate through a self-acquired method nor has had instruction adapted to his major mode of learning, he is likely to accumulate a disability in reading, in addition to a *negative* learning set in this area.

In diagnosing word recognition errors, care must be taken not to confuse various levels within a particular mode. For example, an individual may have good auditory acuity, that is, a peripheral auditory system in good functioning order, but his auditory conceptual system may not be operating adequately or at a sufficiently mature level to enable an individual to learn to respond well through that mode. In other words, an individual may have satisfactory acuity, but lack of ability to organize the auditory stimuli, as Kyme (44) has demonstrated. Although Kyme's study was in the area of musicality or aesthetic judgment, there is some evidence that there may be analogous levels of functioning for language in the auditory modality (Singer, 63). The discrepancy between peripheral and central functioning or integration in the auditory mode may also be true in the kinesthetic and visual modes.

CHARACTERISTICS OF TASK-STIMULI AND MODES OF CONCEPTUALIZATION

Because of the nature of printed stimuli of language and his capabilities, the individual can learn to conceptualize such verbal stimuli through emphasis upon different modes, such as auditory, visual, kinesthetic, or a combination. That is, some aspects of printed language can be sounded out and auditorily grouped, such as *see*, *tea*, *tidy*; other parts of words may have identical letter configurations, such as l*ight*, s*ight*, r*ight*, and can be organized into visual concepts; and all printed stimuli have characteristic lines or curves which the eye can follow and integrate into a general response because of kinesthetic features (Hebb, 28), such as the up-and-down-and-across characteristics in *t*ree, *ate*, boa*t*.[3]

However, any one word does not necessarily fit into a particular conceptual category, nor do two individuals necessarily develop the same conceptual responses or organization of responses. When a word does fall into multi-categories, an individual may form and draw upon several concepts and coordinate them into a working system to solve the word recognition task. For example, the word "right" may have an auditory unit or phonogram, "ri;" a visiogram, "gh" (silent); and a phonogram, "t," for one person, but another individual may have developed a larger gestalt, "r" and "ight." Still another person may perceive this word by its entire configuration and respond to it by means of a "whole word" process. Whatever concepts are formed, an individual will have to organize them into a working system to meet the demands of the task-stimuli.

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[3] An appropriate name for kinesthetically formed images of printed stimuli, the writer suggests, is "kinesthetograms."

Flexibility in Word Recognition. Conceptualizations in different modes enable a reader to recognize words in a variety of ways. Multimodal conceptualization of responses to words is necessary since words and parts of words do not fit into any one mode. Thus, if an individual starts to sound out a word, he may find that he has to stop at *a particular* boundary-point within the word because the next part could not be integrated as an auditory component; then, if he has the necessary visual or kinesthetic concept, he can utilize it. Finally he has to blend of synthesize all his responses together to form the whole word. In some instances a reader may fill in a missing word by calling upon his word sense. The conditions necessary for flexibility are (a) a variety of processes that can be organized into a working system appropriate to the task-stimuli, (b) a mental process which enables an individual to sense the necessity for shifting from one process to another, or to resolve discrepancies that may arise from a narrow response unit by calling upon a broader conceptual response, (c) a fairly evenly developed cross-section of abilities, and (d) a growing feeling of confidence in and mastery over the processes involved in learning to read.

Obviously, if an individual has only one approach, he can not shift to another. If he encounters a barrier to his one technique, he must stop because he has no other approach to circumvent the barrier or to make it permeable. For example, an individual may have a phonetic approach which works very well with c-a-t and such words, if properly applied, but which will not function with r-i-g-h-t. Or an individual may be able to sound out "ri," but reaches a barrier for "gh" if he systematically tries to sound out each letter. However, he may be able to circumvent this barrier if he knows "ight" as a phonovisiogram or he may be able to break the barrier if he knows the visiogram "gh" (silent) and passes on to the last letter of the word.

Even if an individual does have a broad word-recognition-substrata of phonics, syllabification, affixes, blending, and rhyming processses, he must also have some mechanism which institutes a reorganization of his word-recognition-substrata. If he does not reorganize, then he might persistently bump against the barrier. Sometimes in oral reading a child may be observed as he reaches such a barrier; instead of shifting to another approach, he backs up to the beginning of the sentence, as though he were going to get a running start of context clues to overcome the barrier by sheer ideational force.

The mechanism or process which institutes the switching or reorganization process might be termed "flexibility-in-manipulating-verbal-symbols." A necessary component of this process is the ability to generalize or conceptualize within limits appropriate to the task-stimuli of each mode. At the extremes of this conceptual span are the overgeneralizer and the undergeneralizer (Zaslow, 78).

The overgeneralizer, the person whose generalization within a particular mode is very broad, will tend to be frustrated in certain situations. For example, he may recognize correctly m*eat* and s*eal*, but not br*ead*, if his generalization includes *all* vowel combinations of "ea," instead of only those which do not follow "r." Bright children may be in this classification early in learning (Carroll, 13, 14).

The undergeneralizer, the person whose concept in a particular mode is narrow, will tend to have difficulty in recognizing words, even though they are in his hearing or meaning vocabulary, which he might have recognized if his concept were broader. For example, the undergeneralizer might recognize s*eat*, but not be able to recognize b*eat*, even though he is able to substitute consonants, that is, he may not have developed a category for "*eat*." He might consequently think that the word recognition processes for each word are unique. This approach is probably characteristic of certain brain-damaged individuals who lack capacity for conceptualization.

The flexible generalizer, the person whose concept is inclusive but within appropriate boundaries, will tend to apply his concept when appropriate but shift to another readily when the first does not apply. For example, he may have acquired the concept that when two vowels are together, as in b*oa*t, the first vowel says its name and the second is silent, but he knows there are exceptions, such as "pneumatic" or "oil."

Differences in Mode of Conceptualization. Differences exist not only *between* individuals in each mode, but also within the *same* individual. Kling (42), for example, computed a correlation for college students of .03 between auditory and visual discriminations for nonverbal stimuli.

Comparison of individuals on any one aspect of word recognition results in a distribution whose shape reflects the general level of maturity for that process. At the fourth grade, for instance, knowledge of letter sounds is negatively skewed (Gates, 22) because this ability has already reached maturity in most of the subjects. But syllabification, a process still being developed at the fourth grade, yields a normal curve of distribution.

Measurements made repeatedly on the same individual in all three modes would probably reveal intraindividual differences in learning mode; over a period of time, these measurements would theoretically reveal a gradient shift from kinesthetic-to-auditory-to-visual dominance in mode of learning ability (Holmes, 31). However, individuals, in general, do not necessarily need to develop to perfection in any one word recognition process. Instead, by means of a combination of fairly well developed skills in the various processes or modes, they can achieve sufficient accuracy in word recognition so that they are not handicapped at all *in transforming any word into mental processes for the purpose of arousing and associating meaning.*[4]

Emotional and Personality Factors. The degree of stress which an individual feels he is under while reading will tend to influence the breadth of his "cognitive map" (Tolman, 73). For example, in reading orally he might feel unduly self-conscious and consequently be very sensitive to his errors. These feelings, in turn, could feed back into and constrict his mental processes. This constriction would then operate against fluency in reorganization or selection of alternate routes required by the characteristics of the task-stimuli. But, under less emotion-provoking conditions, such as in silent reading, when he found himself blocked in one approach, he is more likely, if he has the necessary abilities, to fluently reorganize his word-recognition-substrata and mobilize a working system that is more appropriate for solving the particular word recognition task. Of course, a basic assumption for this flexibility is that the individual had been taught or had learned multiple routes to the goal of success in word recognition.

However, sometimes experiences in emotion-provoking situations may perseverate or be aroused in silent reading situations. For example, a child might have learned from a perfectionist, a teacher or parent or both, and as a consequence might feel that he is unable to read whenever he could not transform all the stimuli into corresponding oral responses that perfectly match the characteristics of the stimuli. Then, in reading silently, even at the 95 per cent level of word recognition accuracy or at a level at which he could accurately attain ideas from the material, he would still not read with a feeling of enjoyment or satisfaction, for he would tend to recall the voice-of-conscience whenever he stumbled or slurred over a word.

At the other extreme, a permissive or laissez-faire atmosphere, could also result in inaccurate responses to printed words. In this environment an individual might not acquire the necessary motivation to make fine discriminations between and within words. Furthermore, the individual in this learning atmosphere might not receive sufficient correction for his errors. Because of this lack of motivation and feedback, the individual might be hindered from developing a learning set (Harlow, 27) for improving his word recognition abilities.

Fixation in Development of Word Recognition. If an individual's ability in one area is disproportionately better developed than his abilities in other word recognition processes, he is likely to use his most developed ability ,whether or not it is appropriate to the task-stimuli; that is, he might leap-before-looking, so to speak. Consequently, such an individual would continually experience frustration, until his other word recognition abilities had developed to the point where they could be mobilized into a working system for attaining word recognition.

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[4] This hypothesis may explain Triggs's (74) otherwise puzzling results. Triggs reported that mean scores from a cross-sectional investigation on syllabication and rhyming, subtests of the Diagnostic Reading Test, rose steadily through the twelfth grade. Performance on these variables dropped slightly from grade 12 to college while comprehension still continued to improve.

However, some individuals might become fixated at a particular level of development in word recognition. For example, such an individual might use a combination of context, whole word recognition, or spelling, if the first two did not work. Because this combination could work for many words, he might not feel the necessity for expanding his repertoire of word recognition abilities.

Although a "gradient-shift" (Holmes, 31) might be a general characteristic of development towards maturity in which an individual reorganizes his word recognition processes and shifts from an inefficient to a more efficient and effective method of processing stimuli (Gates, 21; Singer, 66), a fixated individual would not fit into this developmental process. The manifestation would show up mostly in speed of reading. However, there could also be an interference in comprehension or in continuity of thought because an excessive concentration of energy had been utilized in overcoming word-barriers and because a maximum span of attention had been surpassed.

Summary on Word Recognition. Normal development of a word recognition subsystem is dependent upon adequately functioning kinesthetic, auditory, and visual perception and conceptual processes, plus an integrated and flexibly operating intercommunications network among these processes (Holmes, 33; Singer, 63). Facilitation of this development results not only from conceptualization of responses to printed stimuli, but also from considerable practice and experience in a moderately motivating and emotionally satisfying atmosphere for learning to read. Under these organismic and environmental conditions, an individual could form highly organized and flexible word-recognition-substrata which function so harmoniously and rapidly that the processes mobilized for this subsystem not only psychosynchromesh but also require a minimum of mental energy. Therefore, a maximum of mental energy could be devoted to the reasoning-in-context aspects of reading.

However, when a strange or unfamiliar word does appear, an individual has to mark time in his mental processing of the content and switch most of his mental energy to the operation of his word-recognition-substrata. This reduces his speed of reading and may interfere in his comprehension to the extent that he will have to re-read (Bayle, 4). When he has built a bridge over this gap in the continuity of his word-recognition-processing, the reader can then switch most of his mental energy back to his reasoning-in-context substrata or processes that are mobilized for attaining the central thought, integrating dispersed ideas, inferring from explicit or implicit premises in a passage, and such processes that go beyond word recognition and association of meaning to the recognized words.

WORD MEANING

If an individual can recognize words, but not have any meaning to associate with these words, the result is known as "word calling." That is, an individual could learn to recognize a word as a whole word, or grasp the word from context, or utilize some combination of word-recognition-processes to transform it, but be unable to associate meaning to it, not because of some lack of association process (Holmes, 33) but because he simply has not had experience, direct or vicarious with the referent or referents of the word. Consequently, meanings for words should be developed concomitantly or even ahead of their appearance in reading material so that the word-recognition-substrata and the meaning-substrata can be integrated. However, in general, at about age 11, development of word recognition surpasses the development of meaning (Gates, *et al.*, 24).

Some linguistic elements, such as affixes and roots, have generalized meaning, which can be utilized not only for unlocking the meaning of a word by analyzing it into its constituent elements and then synthesizing these elements (Hunt, 40) but also can be integrated into the word-recognition-substrata. Consequently these linguistic elements have a dual function.

In the early stages of learning to read, pictures may also enter into the two subsystems of word recognition and word meaning. They may serve as clues for word recognition and enable an individual to recall and associate a word with its object-referent. But, the picture is only a cue to some intermediate verbal transformation. That is, the individual must learn to make a verbal response to the picture and this verbal response then mobilizes the necessary word recognition or word meaning reaction.

Prior to the sixth grade, auditory cues for responses to pictures, as measured by a "reading capacity" test (Durrel and Sullivan, 17; Alden, 1), lead the individual to mobilize a quantitatively if not qualitatively different mental organization from that which is mobilized for response to a visual verbal type of reading test, such as the Gates Reading Survey (Singer, 63, 69). After the fifth grade, the two subsystems of listening comprehension and reading achievement, as assessed by the above types of tests, tend to merge. A possible hypothesis for this merger consists of two components: normally during the early stages of learning to read, the individual (a) gradually develops his word-recognition-substrata and (b) slowly acquires a greater degree of intercortical facilitation and communication between his auditory and visual modalities. When the developmental gradients of these two processes merge at the sixth grade level, the individual can not only transform printed stimuli into ideas at any level, concrete, functional, or verbal-conceptual, in accordance with the context and his level of intelligence, but he can also receive increased stimulation from his auditory modality. Therefore, he can better associate his listening vocabulary with his word recognition processes and his reading vocabulary.

REASONING -IN-CONTEXT

As an individual develops word-recognition-substrata to overcome the barrier presented by words in the form of printed symbols, he becomes increasingly able to use reading as a means of acquiring facts, forming concepts, and relating them as generalizations (Brownell and Hendrickson, 7). That is, he uses his reasoning-in-context substrata, an organized working system of mental abilities and processes, to learn from the printed page.

In a modern instructional program, word-recognition-substrata, word-meaning-substrata, and reasoning-in-context substrata are developed simultaneously. But, as a result of mental capability, training, and practice, the time and mental energy required for word-recognition-substrata in the process of reading gradually decrease while the time and energy employed for word-meaning-substrata and reasoning-in-context substrata gradually increase. This development eventually reaches a point where the mature and competent reader is relatively unconscious of the organization and dynamics of his word-recognition-substrata as he reads. He is almost unaware of the processes because his word recognition subsystems are effectively mobilized, efficiently synchromeshed, and, when necessary, flexibly and readily reorganized in response to the stimuli of the printed page and his motivation in reading. Consequently he can then focus his mental energy upon comprehending the ideas conveyed by the words. Thus, he can read rapidly and fluently, unhindered by barriers to word recognition, and only limited by his word-meaning-substrata and his ability to reason-in-context.

Conceptual ability enters not only into the formation of word-recognition-substrata but also operates in word-meaning-substrata and in reasoning-in-context-substrata. For, as he reads, an individual can inductively form concepts (Werner and Kaplan, 77), heirarchically integrate previously formed concepts (Long and Welch, 49), deductively "verify and strengthen the structure of a concept" (Russell, 61: 162), reorganize a concept (Brownell, 6) or create concepts (Leeper, 48). An individual can thus use reading as one means of developing his concepts from "simple to complex, concrete to abstract, undifferentiated to differentiated, discrete to organized, and from ego-centric to more social" (Russell, 61:249).

Speed and/or power of reading require not only fluency in word recognition but also flexibility in conceptual organization (Murphy, 54), in addition to other types of flexibility (Laycock, 45, 46, 47). That is, to comprehend some passages an individual not only has to conceptualize, but he also has to change, modify or reorganize a previously formed concept. For example, a young child could have learned through his experience that home is a place where parental conflict exists. When he reads a story about parental relationships, he might find that the ideas in this story do not coincide with his concept of home. If he persists with this experientially-determined generalization, he might not "get it," re-read the passage to clarify the meaning (Bayle, 4), or even continue to read with the conflict unresolved. Consequently lack of conceptual flexibility could adversely affect his speed and/or power of reading. For either reading component, the effect may be exhibited more at the judgmental or evaluative than at the factual level (McKillop, 51).

Another element of flexibility is the ability to shift from one concept to another in the process of reading. That is, a competent reader selects the relevant words and organizes them into concepts; he also uses previously formed concepts in responding to the material. The flexible reader modifies his conceptual span and appropriately shifts from one idea to another. If he has an overly broad span, he will probably attempt to include too much of the material into his concept and encounter confusion; if he has a narrow span, he will tend to exclude material and perhaps not arrive at a concept but only a sequence of events. In either extreme, the reader will not form the intended idea. In general, the ability to form an optimum span and adequate conceptual level is a function of mental age and normal developmental processes (Zaslow, 78).

Thus, in learning to read, an individual with the necessary capacities can develop a conceptualized mediational response system. Then, in accordance with his purposes and the demands of the task-stimuli, he can mobilize this system together with other subsystems into a mental organization for attaining speed and power of reading. Although each individual forms a working system that is composed of his unique strengths and weaknesses, he must mobilize at least minimum amounts of certain common subsystems, if he is to read at all (Holmes and Singer, 36, 38). Consequently, each individual's working system varies around a basic, developmental working system that is the common route to maturity in speed and power of reading (Buswell, 11; Holmes, 30; Singer, 63, 66; Holmes and Singer, 36, 38).

SUMMARY AND IMPLICATIONS

A theoretical formulation of the role of conceptualization in the acquisition of reading behavior was presented and an attempt was made to integrate this theoretical formulation with the substrata-factor theory of reading.

Theory is designed not only for explanation, but also for prediction (Singer, 68). Already plans have been made to test at the kindergarten level the predictive validity of an instructional strategy based upon the above theoretical formulation (Singer and Balow, 70). Eventually, a longitudinal investigation should be undertaken to test the developmental implications of this theory of conceptualization in learning to read. In the meantime, the theory can be used as a cognitive guide for teaching reading (Singer, 64, 65, 66, 67).

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Personality Factors and the Development of Successful Readers

Irene Athey
The University of Rochester

To facilitate their understanding of human dynamics, philosophers and psychologists have traditionally divided behavior into the three areas of cognitive, affective, and conative psychology. While this approach may be less common today than formerly, it has tended to lead to a dichotomy of interest and specialization which still colors most psychological theories. For example, theorists like Piaget, who have concentrated on the cognitive domain, have tended to develop theories of intellectual functioning in which motivation itself is conceived in cognitive terms. On the other hand, psychoanalytic psychologists such as Erickson have elaborated personality theories which make only incidental reference to the role played by cognitive processes in the development of the healthy personality.

Recently Flavell (4:414) has suggested that:

> there is an exercise . . . we have tried and found to be a good one; read what Erikson has to say about the effective and interpersonal aspects of the preoperational period and see how Piaget's analysis both complements and significantly adds to Erikson's account; how a sense of 'the whole child' emerges more clearly in a stereoscopic interpretation of the two.

There are indications that other workers are engaging in this "exercise" of relating cognitive and personality factors, (7).

This paper reports the results of a study which seeks to go beyond a mere "exercise." It represents a formal attempt to integrate a personality theory and a cognitive theory which deals specifically with reading. Coincidentally, the personality theory is again that of Erickson. The theory of reading is Holmes' substrata-factor theory. Erickson's theory was chosen for two reasons. In the first place, it deals with the development and functioning of the normal or healthy personality, and the object here was to consider learning to read as a developmental task which challenges every normal member of our culture. In the second place, personality concepts such as autonomy, trust, and initiative, which seem to be important, if not crucial to learning, play a central role in the theory. Holmes' theory was selected because it is, perhaps, the most comprehensive in the field of reading and, to the writer's knowledge, the only one which takes cognizance of the fact that personality, as well as cognitive factors may play a significant role in reading ability. To be sure, other writers have looked for possible relationships between personality measures and reading, but we are speaking here about the incorporation of personality concepts into a *theory* of reading.

Erickson (3:53) conceives the whole psychological span of human life as a series of eight steps or stages, each ushered in by a basic conflict or task, the successful resolution of which contributes a new dimension to the growing personality, and prepares it to pass on to subsequent stages. Each dimension is "systematically related to all others, and they all depend on the proper development, in the proper sequence, of each item." For example, the first dimension, or quality, which is established in the baby is basic trust, and its establishment at this point in time is prerequisite not only to its further development throughout life, but also to the emergence of the second stage in which autonomy is generated. In turn, autonomy lays the foundation for the third stage, which sees the creation of initiative. But it is the fourth stage which is of particular interest to teachers of reading. This stage, which Erickson calls "industry *vs.* inferiority," occurs around the time the child first enters school. If his development has progressed favorably to this point, that is to say, if he has laid the foundations of trust, autonomy, and initiative, he is now in a position to develop a sense of industry, to advance to new stages of real mastery, and to identify with those who know things, and know how to do things. To quote Erickson

> One might say that personality at the first stage crystallizes around the conviction "I am what I am given," and the second "I am what I will." The third can be characterized by "I am what I can imagine I will be." . . . and the fourth "I am what I learn" (3:82).

In brief, during the first six or seven years of his life, by learning to trust others and have faith in himself, the child has come to feel that *he* is worthwhile, and that what he and others are doing is worthwhile, a feeling without which academic learning becomes meaningless.

Turning to the cognitive side, Holmes (5, 6), in his substrata-factor theory, sets forward the view that reading is a complex process involving a hierarchy of verbal, auditory, and reasoning skills. Some of these skills are essential, if the child is to read at all. But other competencies in his repertoire may also be mobilized to increase his proficiency in the reading task. Holmes hypothesized that, among these competencies, specific personality characteristics would be found to make a significant contribution to reading success. However, his studies at the high school and college levels failed to substantiate this prediction, as far as the personality characteristics measured by several well-known scales were concerned. Of course, most personality inventories were designed for screening purposes, and it should occasion no surprise that they show very low correlations with reading and other areas of academic achievement. But it also seems unlikely that the facets of personality with which they deal would have any bearing on reading success. A more promising area to explore would deal with the kind of personality variables which Erickson sees as prerequisite to academic success.

Unfortunately, no valid and reliable tests of such concepts as trust, autonomy, and initiative exist. at least below the adult level. A different approach therefore had to be devised. Essentially, this approach consisted in the construction of new personality scales which pertain significantly to reading.

HYPOTHESES

Following Holmes' reasoning, it was hypothesized that personality factors would be found which would differentiate good and poor readers, and that these factors would make a significant contribution to the variance in reading. Following Erickson's theory, it was further hypothesized that these factors would be those of trust, autonomy, initiative, and other characteristics of the "healthy personality," such as a positive self concept and lack of anxiety, both of which he deems to accrue from the successful establishment of the first three stages.

PROCEDURE

The procedure consisted in submitting each item of a 300-item adolescent personality inventory, the University of California Inventory (9), to a chi-square test, to determine whether it would differentiate between the upper and low quarters of the distribution on the reading subtest of the *Stanford Achievement Test*. The sample consisted of 160 ninth grade students who were members of the California Adolescent Growth Study. The differentiating items were then cross-validated on a further sample of 130 students in the same school system, who were not members of the Growth Study.

Since personality items are notoriously unstable from sample to sample, a double cross-validation was deemed desirable. This was effected by repeating the entire procedure using the second sample first, and the original sample in the cross-validation. Finally, since means and standard deviations were comparable, the two samples were combined, and a third item analysis conducted on the combined sample. At all three stages, the item analysis was made separately for boys, girls, and total group.

New personality scores were obtained by rescoring every subject in the two samples on the significant items. Correlations between these new personality scores and reading scores were examined, to determine whether they remained stable from sample to sample.

An item was retained in the final pool if it satisfied the following criteria: (1) It discriminated at or beyond the .05 level on at least one sample; (2) the discrimination was in a consistent direction across *all* samples. Actually, many items discriminated beyond the .001 level for all samples and groups within the samples.

The final pool of 60 items which satisfied the above criteria correlated .53 with reading for the total sample. These items were then intercorrelated, and the ensuing matrix submitted to Hotelling's components factor analysis, to determine whether the discriminating items would cluster into factors suggestive of Erickson's concepts. Since no major sex differences were discernible throughout the entire procedure, results are reported here for the total sample only.

RESULTS

The first factor which emerged was one which seemed clearly to reflect an autonomy syndrome. The content of some of the items was such as to suggest that poor readers as a group not only considered themselves to be more dependent upon their parents than did good readers, but that they approved of this situation, and would not wish it otherwise. For example, the three items with the highest loadings of .81, .80 and .79 respectively, to which the poor readers emphatically answered "No," were:

1. M knows he is old enough to make his own decisions. Am I like him?
2. P likes to sit by himself and imagine things. Do I wish to be like him?
3. M knows he is old enough to make his own decisions. Do I wish to be like him?

But when it came to the question "B always does just as his mother tells him. Do I wish to be like him?", the poor readers answered with an overwhelming "Yes." This item had a loading of .75 on the autonomy factor. The poor readers also admitted that they were not allowed to go out with friends or stay out late, and indeed spent much of their time voluntarity helping around the house.

The suggestion of docility on the part of the poor readers was also apparent in such items as:

T would rather agree than fight. Do I wish to be like him?

H is careful not to hurt people's feelings. Do I wish to be like him?

which they answered in the affirmative, and:

Q fights his brothers and sisters. Am I like him?

G is a leader. Am I like him?

to which they gave extreme negative responses.

The second factor appeared to measure certain aspects of the self concept. The following items were of the "Am I like him?" type, and were answered "Yes" by the good readers and "No" by the poor readers:

J is the most popular boy in school

O is the brightest in school

E gets good marks on all his school work

G is a leader
A's teacher likes him very much

Each of these items had a loading higher than .65 on the self concept factor. It may be noticed that, although some of these items reflect the poor reader's feelings of inferiority with respect to school work, others reflect similar feelings about his social accomplishments. In other words, the poor reader appears to have a pervasive lack of self-confidence and an all-encompassing sense of inferiority.

The third factor reinforces this observed tendency. It consists entirely of items taken from a checklist of "things disliked about school." The poor readers' dislikes are all concerned with social matters: being laughed at by other students, having to recite in front of others, having classmates who are snobbish, or starting exclusive clubs. The good readers' dislikes revolve around the personality of the teacher and the quality of the school work.

The fourth factor was labelled "Family orientation." The items composing it suggest that the poor readers are closer to their parents, in the sense of looking to them for nurturance and companionship, rather than to peers, whereas in the good readers, the process of psychological weaning appears to be well under way. This accords with the poor reader's perception of himself as unacceptable to his classmates, but there is also the suggestion that his parents foster this kind of dependency, and that both they and the student are satisfied with his immature status. Even when they will be old enough to leave school, the poor readers plan to continue living at home, while they are earning a living, while the good readers elect to continue their schooling. For the latter, school seems to have been a rewarding experience, both academically and socially.

DISCUSSION

The reported findings were interpreted as confirming the hypotheses derived from the theories of Holmes and Erickson, and to that extent as supporting the two theories. Apparently, Holmes was correct in inferring that personality constellations which would discriminate between superior and inferior readers could be isolated; and the factors which were isolated resembled, in certain respects, the characteristics which would be predicted from Erickson's theory. The qualities of autonomy and initiative appeared to be particularly discriminating, as was the nature of the self concept manifested by the two groups of readers. There was also some evidence that the good readers had fewer anxieties and worries than the poor readers. In brief, the good readers exhibited most of the traits one would expect in children who have passed successfully through Erickson's first four stages. The only quality which did not appear in the factor analysis was that of trust, for which no evidence was available either to confirm or refute the hypothesis.

All in all, the results of this ground-breaking study appeared sufficiently promising to warrant embarking upon a much larger research project along the same line of inquiry. Obviously, the domains isolated are suggestive rather than exhaustive of the possible relationships between reading and personality, but they appear to be important ones. The next step will be to clarify and expand these domains, so that valid and reliable scales which predict reading success may be constructed. When this step is accomplished, it will then be possible to make a longitudinal study starting in the elementary school, which will reveal the changing interrelationships among these factors, especially as these changes affect reading. With clarification of the domains, it will also be possible to assess their contributions to the reading criterion in terms of Holmes' substrata factor theory. Such a program is already under way.

Perhaps the most important implication for educational practice which can be drawn from this study is the need for teachers, especially at the early grade levels, to develop in their children the qualities of autonomy, initiative, and industry. This can best be achieved by exposing the child to many rewarding experiences, which not only stimulate his curiosity, but give him the good feeling that he is participating in something that is worthwhile, and that consequently *he* is worthwhile. If Erickson's theory holds, then the time to do this is *before* a child enters school on a regular basis. This seems to be the premise underlying such endeavors as Project Headstart. But the role of autonomy in academic achievement is not confined to the early years. In studies conducted by the Center for the Study of Higher Education at the University of California (1), one of the most powerful factors differentiating between successful and unsuccessful college students was the Autonomy scale of the Omnibus Personality Inventory (2). Eleanor Maccoby (8) has further suggested that one possible factor in the differences in intellectual productivity of men and women may be sought in the different approaches which parents use in controlling and restricting children of the two sexes. Though we have very little concrete evidence on this point, it seems plausible to hypothesize that men's primary interest in things and ideas, as opposed to women's predominant interest in people and service, may stem from the greater sensitivity to praise and blame which is induced in girls ,as opposed to the curiosity and initiative which is encouraged in boys. But sex differences are introduced here only to make a point, namely that we can expect from children, and later adults, the kind of behavior which we train and reward. If we desire a populace which is intellectually alive and curious and creative ,then we must train our children (boys *and* girls) not to be docile, passive, and overanxious to please, but to ask questions and experiment, even when such behavior runs contrary to accepted notions of being a "good student" or "acting like a lady." Perhaps we need to revise these concepts to take in a much greater variety of styles of being studious or feminine. But the basic work, in any case, must go on in the nursery and elementary school and the home. The beginnings of success or failure in learning to read will be found in the combined cognitive and personality structure which the child brings to this important developmental task.

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Conceptual and Personality Factors Underlying Flexibility in Speed of Reading

Frank Laycock
Oberlin College

I should like to discuss a reading skill that is not directly measured in the underlying data for the substrata-factor theory: flexibility in rate. It is an important skill in itself, and it calls up by implication some issues reagrding conceptual and personality development.

WHAT IS FLEXIBILITY IN READING RATE?

As a goal of reading, flexibility is warmly applauded. Conferences regularly salute the reader who can adapt himself sensitively to his text. After all, a light magazine story and the directions for assembling a mail-order wheelbarrow are different, and anybody who treats them alike is a sorry reader. Reading rate is one of the clues to adaptability, and flexible rate is an elusive but highly desirable skill.

Fortunately there are some clear facts about rate flexibility, at least on the surface. It is fairly easy to measure, in both children and adults. There are remarkable differences in voluntary flexibility that show up as early as the intermediate grades of elementary school (3). That is, some people can read very quickly when they wish or when they are asked. Others read just about everything at the same plodding pace. And some poor souls actually slow down appreciably whenever they try to speed up. People also differ, of course, in their ability to recognize immediately which speed is appropriate. Flexibility control can even vary when there is no substantial content and therefore no shift in difficulty. For example, I have asked people to "read" lines of digits set up at random in pseudo-paragraphs. Some people readily alter the rate of this "reading" when asked to; others remain stuck at the same speed (2:320-30).

There is even variation in the gross activity of the eyes (which, as Tinker often pointed out, is a superficial sign and must not be taken for the whole of reading). At the eye-movement camera I have found that persons who can alter their speed easily have better control of eye-movements, faster reaction time, and smoother progression through a sentence or a paragraph. Less flexible readers are more sluggish and awkward, whether under pressure or not (2:311-19).

At deeper levels, it is much harder to decide upon the facts or their significance. In particular, we should find out whether there is any general flexibility of mind, and if so how reading flexibility may be part of it. Among children I have found a fair relationship between voluntary control of reading rate on the one hand, and, on the other, easy shifting from one method of solving certain arithmetic problems to a better method (3). That is,—in reverse—readers who stick to one reading rate tend to persist doggedly with a familiar arithmetic formula, even when the formula is less efficient or actually wrong. However, there is not very much systematic evidence for over-all flexibility in the personality, partly because what the several investigators call flexibility or rigidity varies from study to study, or from one measure of it to another. We may someday find a substantial underlying trait, once our measurements agree; or we may find—as those who studied honesty did, for instance—that individual people vary in the trait, as particular situations or intentions demand.

Now as for flexibility in reading rate, whatever its connection to other sorts of flexibility, there is a major question that transcends all these facts: how do children acquire this skill or miss it? Why do some of them, that is, become more flexible than others? I don't know, but I can specify three different possibilities:

1) A child may consciously figure out how to vary his reading speed so as to fit the shifting demands of what he is reading. Just how he learns we don't know, nor whether flexibility itself can be taught somewhat separately from varying kinds of reading.

2) Whenever flexibility appears, it is the unplanned result of accumulated experience with different kinds of reading matter. Many children who read this way have told me that they never had any instruction in "how-to-vary-speed." But then, of course, neither had the ones who were *not* flexible!

3) Flexibility may be taught, but within a broader framework or timetable that is neurologically or even genetically determined. That is, neither conscious development of fleibility nor topsy-like emergence operates freely. Rather there must be prior maturation of necessary and underlying skills before it does any good to train for or expect flexibility.

FLEXIBILITY AND THE SUBSTRATA-FACTOR THEORY

What help does the substrata-factor theory offer as we try to understand flexibility in reading rate? Since no direct measure of flexibility was included as the theory was put together, we cannot tell where flexibility goes into the flow-charts for power and speed of reading. There are several relevant aspects reported about speed and power, however. The decisive variable—even though we are more directly concerned with speed—is power. The many particular sub-abilities that have been extracted from the total act of reading are mobilized, as Holmes puts it, into an "ordered hierarchy," and "power" is crucial to this hierarchy. The primary contributors to power are such factors as knowledge of word meanings and concepts. Thus we should expect children to develop flexibility most readily by increasing their familiarity with the ideas behind the words that they read. Contrariwise, we can slow them down by shifting to ideas that they do not understand or by excessively complicating the prose, even though the individual words we use may be familiar to them and simple. According to Singer, speed of reading depends, in the substrata-factor theory upon visual sensitivity in younger pupils (at the third grade). By sixth grade, visual properties of words give way to the meaning itself, until a more judicious balance links visual recognition and meaning (5).

In order, then, to shift reading rate easily, both speed and power must be considered. With or without substrata factoring, it is plain that both accurate sensing of a word's form and confident reaction to its meaning are required. "Interfacilitation" of the various components for both speed and power is thus the probable key to flexibility, and whatever increases interfacilitation especially associations among ideas) should make possible greater flexibility. Therefore I am impressed by the reports from Holmes, that speeded reading does not result from mere practice upon easy material, but rather from persistent pressure to increase interfacilitation—that is, to multiply associations among the several factors contributing to reading (1:147). The greater the number of associations, the more easily a reader may reduce the individual cues he requires and still go fast. The richer will be his understanding of the content if he prefers to attend to emotional connotations, sounds, or conceptual complexities. It may be, as Singer's data suggest, that a common source of inflexibility would show up in the child whose natural approach to reading emphasizes auditory cues. He may tend to be a slow, if powerful reader, and thus relatively less flexible because he does not easily speed up. Another pattern might appear in the more typical child, whose natural avenue is visual. If he does not cultivate power so faithfully as speed, his comprehension will suffer. He, too, would be relatively inflexible, because he recognizes word forms without properly comprehending the ideas they convey—and so he cannot shift about smoothly among the ideas.

Flexibility assumes that a reader can see the words correctly (and eye-movements suggest that greater flexibility usually goes with more efficient seeing). But it requires much more—a sure grasp of the ideas that the words are there to convey, which the substrata-factor theory associates more with power of reading. If so, then I find it helpful to see, in flexible reading a form of reasoning: a reader is constantly examining what he is reading in order to decide how to go on, which ideas dominate the others, where it is safe to jump ahead because very familiar ideas are at hand, and so forth. All this goes on at the same time as thoughtful consideration of how clear or true or consistent the text itself is.

STAGES VS. EXPERIENCE IN DEVELOPING FLEXIBILITY

At this point the perspective for reading rate flexibility quickly expands, for we are now considering not just word-by-word progress through a page of print, but reaction to the ideas and associations called up by the words. Here we encounter all the problems that have occupied those who wonder how the mind of a child gradually comes to think effectively about more and more complicated matters. I should like to discuss briefly two somewhat opposing views of how this development proceeds. One view emphasizes (as developmental psychologists and others do) a pre-determined growth sequence. Along this sequence a child's mind changes in stages whose order (if not timing) is predictable and perhaps immutable. The other view (familiar to learning specialists) sees a child's behavior, at whatever age or degree of complexity, as the sum or product of his previous experience and learning. These two views overlap at important points, but they diverge impressively before this question: can the sequence of stages be altered or speeded by appropriate experience? For reading rate, this question becomes: is progress toward flexibility tied to a constitutionally determined sequence of stages, or does sheer opportunity for experience or training suffice? Perhaps there is a middle ground, along which a sequence of steps must be passed, but where instruction and careful practice are necessary.

Piaget's stages: Ambitious theoretical proposals regarding the development of children's thinking have come from Jean Piaget and his collaborators. "Genetic epistemology," as they call it, has occupied Piaget for several decades, during which he has tried to discover how infants, children, and adolescents learn to reason about the world. His basic assumption is that there is a series of steps leading to mature reasoning and that these steps must be taken in order. Thus during the first two years or so of life, an infant reacts through his senses and by muscular exploration to the things about him. He does not classify them, and he does not abstract or symbolize. Between about two and eleven years, he then masters so-called "concrete operations," by which he begins to become familiar with symbols. He classifies objects and learns some of the logic of their relationships. But he is tied to direct experience with concrete objects when he thinks. The third and last stage of development, usually during adolescence, comes when he frees himself from immediate experience and begins to consider hypothetical possibilities systematically. He can then experiment, theorize, and truly abstract. He engages in what Piaget calls "formal operations," and deals nimbly with ideas as such.

Under pressure from his critics, Piaget has agreed that the age spans he assigned to these three stages are not fixed. Some of his students, notably Laurendeau, have in fact derived significant average departures from the ages that Piaget recorded on Geneva children. Collaborators, among them Smedslund, have even aranged educational programs that appear to speed up the stages. (Piaget's repeated reaction to the question, "Can the stages be hurried or telescoped?" is an irritated jibe that this is one of those "typical American questions"). But he will not mute his insistence that the stages have a necessary sequence, even though the ages assigned them can be greatly modified. For his assumption is basically developmental, that a child's nature dictates that he must proceed step-by-step. He specifies nervous system maturation, appropriate experience, and response to social situations as three important determinants of progress. But he puts greatest emphasis upon a fourth: "equilibration." By equilibration he means adaptation, active adaptation, to new experience. He puts the burden of learning on the child, who otherwise would merely imitate others, without really thinking himself.

I find Piaget's elaboration of this critical skill of equilibration helpful in thinking about reading flexibility. For it is necessary in both equilibration and flexibility for a reader to be constantly aware of how all the possible interpretations of a passage, for example, fit together. Past experience, various sections of the text, the purpose for the reading—all these rest upon each other, and the flexible person is probably the one who most effectively deals with their relationships. I also suspect that interfacilitation, in the Holmes formulation, refers to a similar critical activity that a child must eventaully master.

Certain particular features of Piaget's system can be related to reading flexibility, although Piaget himself concentrates upon other problems, such as quantitative relationships and formal reasoning. First there are formal operations themselves, the most advanced stage in thinking. In reading, as elsewhere, there is the greatest freedom—hence the greatest boost to flexibility—when a reader can move out and away from the text that he is considering and even from his own direct experience. Second, three related mechanisms of thought that are critical to Piagets' system apply to reading flexibility: conservation, reversibility, and transitivity. They operate when a person notes constancy amid change, follows a process whether to or fro, and draws relationships among indirectly connected matters. These three skills begin to emerge in the intermediate period of concrete operations, but they do not really flower until—with formal operations—they can be employed without the need of specific objects to be present. In reading, to be flexible is to realize that an author's ideas may be put into more than one form, that a passage may serve various demands, that "reading" is more than a lock-step march from one word or phrase to another. At best, then, reading is "operational" when the ideas in the passage can be freely associated with each other and with all relevant material or experience.

To the extent, however, that Piaget's elaborate key to the development of thought turns upon an inviolate sequence of steps, he has been unable to convince all of this critics. Even in recent years, when he has made room alongside his clinical interview routine for careful sampling, statistical significance, and control groups, he has met resistance to the doctrine of stages. After all, whenever in the pre-school years children can be found who are using abstractions (albeit, perhaps, easy ones), or who later on are solving problems hypothetically when they should still be working at a lower level, it is hard to believe in a stiff sequence. And it has been typical among American students of cognition to find a spiral rather than a straight-line sequence. That is, concrete and abstract elements complement each other, grow out of one another throughout most of the childhood years.

Now this controversy has special importance to the study of reading. Reading, by definition, is abstract, and children can learn this skill at a very tender age indeed. There have been inveterate admirers of Piaget who argued that abstract matters like reading belong in adolescence, and should therefore not be forced upon the young. We have, of course—especially among the look-and-say folk—an insistence upon "experience first, symbols second," which Piaget himself would applaud.

Experience: Those who find themselves unduly hampered by a sequence of stages in mental development argue that even when stages occur, they are the result of experience more often than of some inner unfolding. Direct instruction is for them not only desirable, but applicable whenever called for. If a child in a metropolitan slum has a little experience and less vocabulary, then we should try to make up lost time by providing him with sustained enrichment. That is, instruction, instead of waiting upon readiness, should in fact push it along. They would also argue, I suspect, that flexibility may be stimulated or inhibited more by experience than by an inner clock. Their best evidence probably comes from remedial teaching, where it is axiomatic to expect emotional disturbance to paralyze progress, or for deficient experience to limit meaning. Certainly a child will hardly become a flexible reader if his attention centers upon a personal problem or if he can't recognize what an article is all about. Moore reports, for instance, that tense or disturbed students do not skim, that skimming seems to require a certain inner freedom. It is lack of experience itself, or emotional tension, that must be directly responsible, rather than some previous and prerequisite stage that was missed (4:205).

CONCLUSION

Regardless of whether flexibility in reading has a determining sequential base or is a response to environment within a looser pattern, a few summary remarks are in order.

First, flexibility in both rate and more general attack is important enough to receive direct attention. If the substrata-factor theory does nothing else, it points out a remarkable array of contributing characteristics, that together constitute reading. As we find out which ones are most directly related to flexibility, we shall probably be able to set up diagnostic routines and pedagogic tools for fostering it.

Second, following the lead of developmentalists like Piaget, and of most contemporary specialists in learning and cognition, I think that a crucial contributor toward improvement in flexibility is active attention and vigorous practice. Whether as equilibration (with Piaget) or as interfacilitation (with Holmes), a child makes strides toward independence and maturity as he actively seeks ever-widening connections. Both direct experience with concrete objects and vicarious experience with books or ideas yield confidence in working out one's own choices for dealing with concepts.

Third, there are apparently many, many ways in which individual children develop their reading skills. No single avenue toward flexibility exists. Therefore we must not only check among the many subfactors that may be suspected, but we must also assume that particular readers will display their own unique combinations of sub-factors. If a beginning reader doesn't understand whole words presented visually, we long ago learned to try auditory approaches, and failing them even kinesthetic ones. Just so with the more advanced skills required for flexibility, we shall undoubtedly still have to help Johnny and Susie individually.

Finally, at the opposite pole from pedagogy, I look forward to learning more about the basic mechanisms that give rise to and sustain flexibility. Along the whole front from environmentally oriented sociologists to developmentally sensitive neurologists, there should come a wealth of new information. I recognize the substrata-factor approach as important not only for the information that it may provide, but even more for the stimulation and argument that it is provoking.

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Power of Reading Through Interfacilitation and the Content Areas

Martin Kling
Rutgers University

A basic tenet of the Substrata-Factor Theory of Reading as formulated by Holmes (8, 9), Holmes and Singer (11, 12) is to ultimately account for one hundred per cent of the variance of whatever makes for individual differences in the reading process. By successive approximation and fractionation, the nature of the scientific method, Holmes and his students have extended the Substrata-Factor Theory into the domains of physiology underlying reading as explored by Davis (6), conceptual ability as reconceptualized by Singer (19), values as reformulated by Athey (3), and content areas as subsystems by Kling (14, 15, (16). Some isomorphic relationships between the Substrata-Factor Theory and General Open Systems Theory have also been developed by Kling (15).

The purpose of this paper is to summarize the history of, and some of the research in the content areas prior to the Substrata-Factor Theory, to raise some questions about the meaning of the previous research, to develop key theoretical concepts from the Substrata-Factor Theory as they apply to the content areas, and to report some findings stimulated by the theory. Implications of the Substrata-Factor Theory for further research and teaching in reading will be indicated.

HISTORICAL BACKGROUND

Probably the first programmatic plea to do research in the content areas was made by Judd (13:9) in 1915.

> . . . the cultivation of special psychological studies in each field may therefore be added an equally urgent plea for a comprehensive study of the psychology of all fields. One of the gravest menaces to the unity of educational institutions today is the lack of common interests on the part of special teachers. . . . If the effect upon the student of a course in English is to make him more appreciative of emotional experiences, what effect will this have upon his interest in geometry? The psychology of the special subjects will thus merge into the psychology of the student. . . .

Indeed, up until the "unrest of the twenties," Leonard (17:287) noted that the basis for organizing and selecting the curriculum content remained practically unchanged for over three hundred years. Essentially, the subject matter was the main basis for organizing the curriculum.

In 1936, steps to bring "unity" into the subject matter fields of instruction were manifest in a correlated curriculum approach dealing

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with the possible type of correlation that English may have with other subjects. This was under the aegis of the National Council of Teachers of English (23). Some sixty-one advisory experts and research contributors representing eighteen subject fields, examined the philosophical, theoretical, logical, and methodological relationships among the various disciplines in relation to English (23). Six forms of correlating subject-matter instruction were delineated:[1]

1. Correlation of X with other fields through incidental references and isolated subjects.
2. An X Course based on correlation with other subjects, but not implying the modification of courses in any other field or the cooperation of other subject teachers.
3. The fusion of X with one other subject.
4. The fusion of groups of subjects.
5. A curriculum based on the integration of all educational subjects.
6. A curriculum transcending subject matter divisions. (23:5)

However, no empirical studies were cited on just how these subject areas interact.

REVIEW OF SOME PERTINENT STUDIES PRIOR TO THE THEORY

Research studies relating reading to other subject-matter areas as well as the language arts (2) began to appear in the late 1930's. As best it can be determined, James Shores' master's thesis (18) done at the University of Minnesota and Eva Bond's doctoral dissertation done at Columbia (5), heralded the beginning of research studies interrelating reading with content areas.

Shores (18) investigated reading and study skills involved in the ability to read history and science. He found, for a ninth grade sample, that the ability to read science materials was significantly related to general and scientific vocabulary and skills in reading graphs, charts, tables, and the ability to understand details. For reading history, Shores found paragraph comprehension, understanding details and grasp of total meaning to be significantly related. In comparing the reading and study skills of science and history with literary type reading he found that neither was significantly related to the latter. Shores reasoned that:

> . . . by the time students have reached the ninth grade, reading proficiency is to a considerable extent specific to the content field in which the reading is done. To speak of general reading ability of ninth grade students without description of the content field in which reading is done is unwarranted. . . . The ability to read scientific and historical materials hold unique and different relationships to a number of reading skills.
> as quoted in Artley (2:182)

Eva Bond (5) also attempted to determine some relationships between various reading skills and achievement in certain subject-matter areas at the ninth grade. Using the Neyman-Johnson Analysis of variance technique on 37 to 300 subjects and holding mental age and chronological age constant, she found highly significant relationships between the criterion, power of comprehension, and grammar, spelling, vocabulary in isolation, English literature, general science, ability to locate information and achievement in algebra. Power of Reading was determined by Part III of the Traxler Silent Reading Test and achievement was measured by the Cooperative Achievement Tests. The reliability of the Power of Comprehension measure was .73, and three of the six paragraphs were classified as scientific, one literary and two social scientific.

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[1] Whenever the word "English" occurs an X is substituted.

Elden Bond (4) in 1940 undertook a similar investigation on the same group of subjects studied by Eva Bond, considering the "interrelationships between reading abilities and achievement" for the tenth grade. Reading abilities included reading comprehension, vocabulary in isolation, general reading speed, science reading speed, newspaper reading speed, location of information, map-graph reading and knowledge of periodicals. Achievement variables were grammar, English literature, spelling, history, geometry, and biology. Intelligence was measured by the Stanford-Binet and the group's intelligence quotient averaged 107.

Intercorrelations were computed for each of sixteen variables on 78 to 200 tenth graders. Using the canonical multiple correlation technique devised by Lorge, Bond computed the maximum correlation between ability and achievement grouping of variables. Three of the multiple correlations approached the canonical value .894, i.e. the five ability variables: reading comprehension, vocabulary in isolation, location of information, combined speed and intelligence quotient on the one hand and the four achievement variables; English grammar, English literature, geometry, and history.

One of Bond't major conclusions was that since the intercorrelations between vocabulary isolation, reading comprehension, and intelligence were so great (in the .80's), it appeared tenable to hypothesize "that to a considerable extent these three abilities have the same and/or similar elements in their makeup."

Artley's dissertation (1) also tried to come to grips with the general and specific factors in reading comprehension especially as they applied to the social studies. Using partial regression coefficient analysis and arranging the relative importance of the various reading and study skills as indicated by beta weights Artley concluded:

> 1. The extent of relationship that exists between tests of general reading comprehension and reading comprehension in a specific subject-matter area makes it appear that, in general, ability to read material of a general informative type is associated with the ability to read a type of material more directly related to specific content area.
> 2. The absence of a near perfect correlation (.75) between measures of general and specific reading comprehension provides evidence that there

> exists a high degree of specificity in the factors relating to reading comprehension in a specific subject-matter area.
>
> 3. The abilities measured by tests of general and specific reading comprehension appear to be present to an equal extent on an informative test of achievement in the social studies.
> 4. A knowledge of word meanings of both a general and specific nature, the ability to interpret, to obtain facts, and to organize appear to contribute most to the ability to comprehend social studies material.
>
> Artley (1:184)

Four stages of development that emerge from a review of the history as well as research in the content areas appear to be:

1. Three hundred years of traditional compartment-mentalized thinking and practice in subject-matter curriculum building.
2. A "visionary" call for research in the study of interrelationships in the content areas by Judd during World War I.
3. A controversial period marked by study groups during the middle twenties and thirties airing ideas about subject-matter organization varying from an "incidental" to an "integrative" approach.
4. An empirical period of noting what goes with what.

The fifth stage which I believe the Substrata-Factor Theory ushered in beginning with Holmes' dissertation of 1948 is the theory building period of trying to understand the "undermeanings" (11) and generate further research based on theoretical constructs.

SUBSTRATA-FACTOR THEORY AND THE CONTENT AREAS

Although Guilford (7) and Smith (20) have offered models of the structure of the intellect, neither of these authors, as Spache (21) points out, have explained how or why these intellectual processes function in reading or the content areas.

The Substrata-Factor Theory emphasizes the dynamics of the cognitive process and develops a rationale for the use of the substrata analysis, a reiterative extension of the Wherry-Doolittle Multiple Test Selection Method developed by Holmes (9.)

> . . . the Substrata-Factor Theory envisions any cognitive ability as a process (a) spearheaded by a high density complex of associational subsystems of different information that is highly related to the criterion-discipline under consideration, plus (b) the sustaining dynamics of a hierarchy of related skills and abilities organized as substrata factors in a functional 'working system.' The mutual and reciprocal assumption of the Theory's model anticipates redundancy circuits, mutual feedback and multiple scanning mechanisms, for these types of mechanisms are needed in order to insure the selection of correct information from within each substrata factor. A substrata analysis becomes appropriate, according to the Theory, when the working system can be assumed to be composed of an integrated hierarchy of subsystems. That is, each substrata factor, and each set of substrata factors, reflects--in its contribution to the variance of the criterion or subcriterion--a partial effect of the integral function of *all* its element associations. In other words, the purpose of the individual in conjunction with the *requirements* of a task, cause the mind to

> mobilize a working system which, so to speak, is composed of many subsystems of abilities which 'stand by' for action. Servoassociations are presents which *alert the entire system* so that various subsystems are ready to deliver 'on call' specifically pertinent bits of information that might be needed to keep covert responses of the criterion task flowing smoothly so that the next response of behavior will be coordinated, pertinent, precise, and smoothly executed.
>
> Holmes (10:15)

A series of studies designed to infer interfacilitation between power of reading and the various content areas have been carried out by Kling (14 ,15). The results of these studies are too lengthy and complex to review at this time. For our purposes, two substrata analyses performed on 120 ninth graders for Power in Reading and English Literature will be reported.

SUBSTRATA ANALYSIS OF POWER OF READING

A pictorial display of the interaction among the various subject-matter subsystems in the working system of Power of Reading is presented in Figure 1.

The major criterion, Power of Reading, is placed on the left under Level 0. Arrayed from left to right are the subject matter subsystems selected by the substrata analysis. The path of the regression relationships between subsystems is indicated by unidirectional arrows. Mutual interaction representing interaction equally assigned in both directions is shown by double-ended arrows. The numbers adjacent to the unidirectional and bidirectional arrows indicate the relative strength of the interaction accounted for by each subject matter subsystem.

The content area subsystem, the substrata sequence, and the per cent contribution to variance in Power of Reading at the ninth grade level can be read as follows:

Beginning with Power of Reading, the major criterion, it can be seen that three subsystems precipitated from the substrata analysis to account for 73.84% of the variance in Power of Reading. The total contribution (direct plus shared variance) to Power of Reading which may be made by each of the content areas is 47.55% by Vocabulary in Isolation, 17.38% by Geography and 8.91% by Arithmetic Reasoning. By referring to Figure 1, it can be seen that Vocabulary in Isolation can be further analyzed into:

Direct variance to Power of Reading	33.72
Shared variance with Geography	9.69
Shared variance with Arithmetic Reasoning	4.14
Direct plus Shared Variance	47.55

Geography can be analyzed into:

Direct variance to Power of Reading	6.32
Shared variance with Vocabulary Isolation	9.69
Shared variance with Arithmetic Reasoning	1.37
Direct plus Shared Variance	17.38

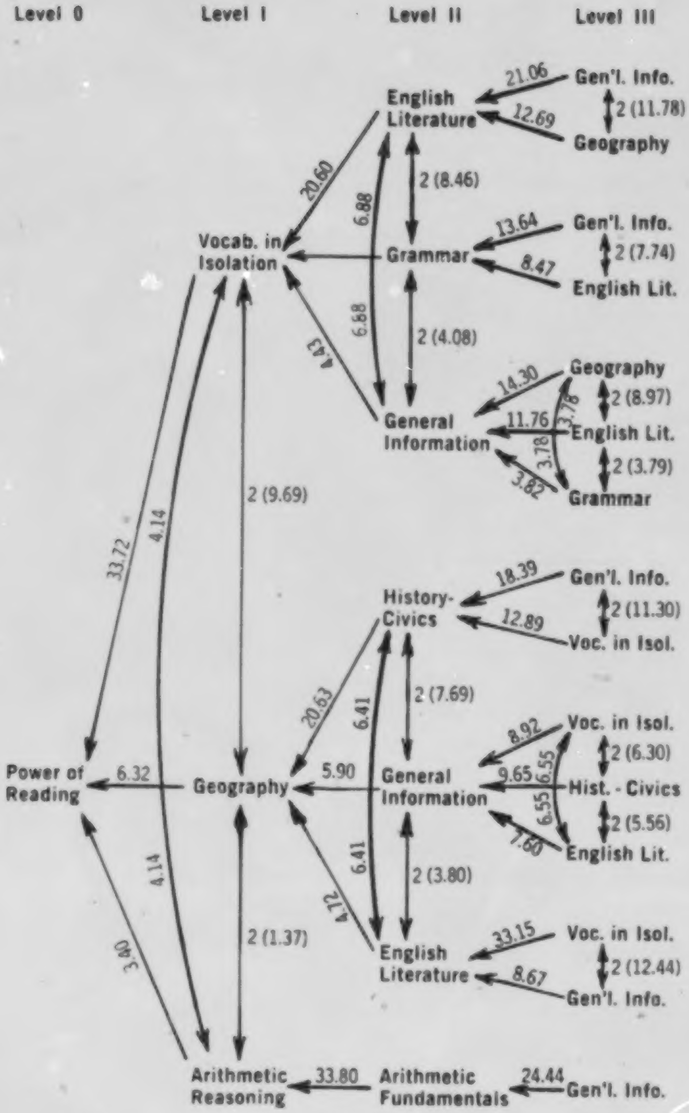
Level 0
Level I
Level II
Level III
English Literature
21.06
Gen'l. Info.
2 (11.78)
12.69
Geography
20.60
6.88
2 (8.46)
Vocab. in Isolation
Grammar
13.64
Gen'l. Info.
2 (7.74)
8.47
English Lit.
4.43
6.88
2 (4.08)
14.30
Geography
3.78
2 (8.97)
General Information
11.76
English Lit.
3.78
2 (3.79)
3.82
Grammar
33.72
4.14
2 (9.69)
History-Civics
18.39
Gen'l. Info.
2 (11.30)
12.89
Voc. in Isol.
20.63
6.41
2 (7.69)
8.92
Voc. in Isol.
6.55
2 (6.30)
Power of Reading
6.32
Geography
5.90
General Information
9.65
Hist. - Civics
6.55
2 (5.56)
7.60
English Lit.
4.14
6.41
4.72
2 (3.80)
3.40
2 (1.37)
English Literature
33.15
Voc. in Isol.
2 (12.44)
8.67
Gen'l. Info.
Arithmetic Reasoning
33.80
Arithmetic Fundamentals
24.44
Gen'l. Info.

Fig. 1. Schema showing interaction among subject matter subsystems in the working system of Power of Reading; figures represent adjusted proportional variance as per cent.

Arithmetic Reasoning can be broken down into:

Direct variance to Power of Reading	3.40
Shared variance with Vocabulary in Isolation	4.14
Shared variance with Geography	1.37
Direct plus shared Variance	8.91

With Vocabulary in Isolation as the subcriterion at the Level II analysis, English Literature, Grammar, and General Information account for 74.77% of Vocabulary in Isolation's variance. Now, with English Literature as the subcriterion, two subsystems, General Information and Geography, account for 57.13% of English Literature's variance. The other branches of the schema in Figure 1 can be read in a similar manner.

SUBSTRATA ANALYSIS OF ENGLISH LITERATURE

A schema depicting the various suprasystem and subsystem interactions for English Literature is presented in Figure 2.

At Level I, two subsystems, Vocabulary in Isolation and Geography, are selected to predict English Literature. Seven-tenths of the total variance of 67.44% is accounted for by Vocabulary in Isolation. The remaining three-tenths, or 20.00% of the total variance is accounted for by Geography. More of Geography's shared variance of 11.56% through Vocabulary in Isolation is contributed to English Literature than directly from Geography itself.

An examination of Figure 2 reveals:

1. Five out of the seven subsystems undergirding English Literature are different from one another in one or more of the predictors.
2. Two identical English Literature subsystems, each having the same variables, General Information and Geography, account for 57.31% of the total variance of English Literature.
3. The range of total variance accounted for is from 57.31% to 67.44%.
4. Except for the two identical subsystems which predict English Literature, the remaining five have different breakdowns of the direct and shared variance even when one variable is identical to another in the substrata analysis.

IMPLICATIONS FOR FURTHER TEACHING AND RESEARCH

Teaching and research arising out of these two analyses as well as others would:

1. Attempt to determine the unaccounted for variance in the major criteria as well as the subcriteria used.
2. See what kind of cognitive maps characterize various known groups--gifted, slow learners, mentally retarded, drop-outs.
3. Determine how various kinds of training methods push the substrata factor around.

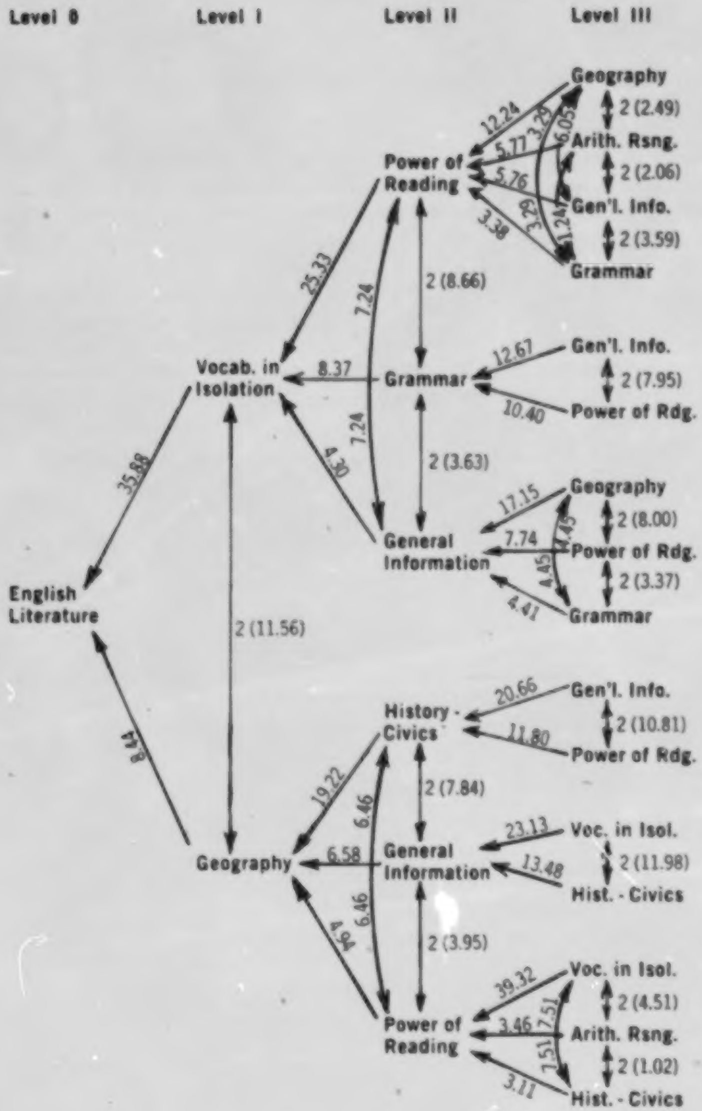
Level 0
Level I
Level II
Level III
Geography
2 (2.49)
Arith. Rsng.
2 (2.06)
Gen'l. Info.
2 (3.59)
Grammar
12.24
5.77
3.29
6.05
5.76
3.29
1.24
3.38
Power of Reading
25.33
7.24
2 (8.66)
Gen'l. Info.
12.67
2 (7.95)
Power of Rdg.
10.40
Vocab. in Isolation
8.37
Grammar
7.24
4.30
2 (3.63)
Geography
17.15
2 (8.00)
4.45
7.74
Power of Rdg.
4.45
2 (3.37)
4.41
Grammar
General Information
35.88
English Literature
2 (11.56)
Gen'l. Info.
20.66
History - Civics
2 (10.81)
11.80
Power of Rdg.
8.44
19.22
6.46
2 (7.84)
23.13
Voc. in Isol.
6.58
Geography
General Information
13.48
2 (11.98)
Hist. - Civics
6.46
4.94
2 (3.95)
39.32
Voc. in Isol.
2 (4.51)
7.51
3.46
Arith. Rsng.
7.51
2 (1.02)
3.11
Power of Reading
Hist. - Civics

Fig. 2. Schema showing interaction among subject matter subsystems in the working system of English Literature: figures represent adjusted proportional variance as per cent.

4. Test hypothesis of mental structure from a developmental point of view.
5. Develop programs and systems which are suitable for the various known groups such as Spache (22) has alluded to.
6. Form a rationale for determining the scope and sequence of the curriculum.

The overall implications for teaching and research growing out of the content area substrata analyses in this paper point toward a specialist with a generalist background and varied interests. Thus, in order to produce a more effective working system hierarchy of the English Literature area, a differentiated knowledge of other fields and borders of interaction between fields is indicated. Indeed, the Zeitgeist would seem to indicate that the man of the future will need working systems which are continually being interfacilitated at all levels in order to have all systems GO.

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Substrata-Factor Theory—A Dissenting View

David M. Wark

University of Minnesota

INTRODUCTION

Is it appropriate to label the Substrata-Factor work a "theory"? Authorities on theory construction agree that the term "theory" applies to a body of writings which can be divided, at the least, into two classes—sentences referring directly to the data of observation, and sentences referring to concepts abstracted from these data (2, 3, 11). The first type of sentences, referring directly to the data base, are evaluated by considering the conditions of control the scientists used in their generation. We might ask if there were adequate control conditions, if the subjects were selected without bias, if the tests were objectively scored, if sufficient steps were taken to rule out reasonable sources of invalidity. For this part of theory, the techniques of experimental design are critical. (1)

The second class of sentences is about the abstract constructs or unobservables. This part of theory is usually evaluated by examining the way empirical findings are combined into theoretical concepts. Statements about the theory terms should at least be testable in principle, if not in fact, and should not be self contradictory. (6) MacCorquodale and Meehl's distinction between hypothetical constructs and intervening variables is central to this problem. (12) They distinguish between an intervening variable, which is defined strictly by operations on observable data, and a hypothetical construct which has or at least may have excess meaning, over and above the data. They point out that the use of hypothetical constructs in theory construction, while intellectually stimulating, is fraught with two sources of error. In the first place, the approach gives tacit permissiveness to ad hoc inclusions into the theory in order to explain novel findings. In the second place, the use of hypothetical constructs allows theory terms to be at odds with actual or possible developments in the next lower explanatory level of science, which for psychology appears to be neurology. Their advocacy of the more objectively meaningful intervening variable has many points in common with operational definitions in physics, or what has come to be called operationism in the social sciences. (14)

The question of the adequacy of data collection, and the criteria for admission of theoretical constructs cannot be dismissed as academic

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nit-picking. As I will try to demonstrate with examples from Substrata-Factor Theory, if the principles of controlled data collection and concept construction are violated the theory may be meaningless, even though it is based on observed empirical relations. That is, a false theory can serve to summarize previous data. It may even provide scientists with pleasant intellectual exercise. But because it is based on a violation of certain practices, it leads to nonsense in the prediction of new data. With this background, let us examine Substrata-Factor Theory, first its data base, then its abstract superstructure.

THE DATA BASE

One elementary question is the problem of representativeness of the subjects used in the various studies. We find that the quasi longitudinal study of grades 3, 4, 5 and 6 (different students used at each grade) by Singer was based upon approximately 1,000 southern California youngsters. (13) The subjects in the high school studies were 400 students in grades 9 through 12 enrolled in a University of California Demonstration Summer School. (10) The college study was done on 126 randomly selected psychology students in "a large agricultural and mechanical school." (9) Any conclusions from the data, then, must be tempered by the range of students represented. At the very least, they are limited to California students from different districts.

A second characteristic problem with Substrata-Factor work is the massive dose of test taking it forces upon the subjects. For example, the 400 high school students in Holmes and Singer's recent study were measured on 54 different variables. (10) From the published report we can account for 3 hours of timed testing, 26 untimed tests, and 9 instruments reported merely as "Controlled time." A rough estimate would put this at a total of 5 hours of testing, probably over at least 2 school days for each student. There are considerable possibilities for systematic measurement errors due to changes in motivation to do well, fatigue, boredom, and Hawthorne effect in any such program, even though any single test, considered individually, may have satisfactory reliability. Campbell presents the design considerations necessary to control, let alone measure, the reactive or interaction effects of such a testing program. (1)

A third data base problem is the unsupported selection of criteria measures. For the speed measure in the high school and college studies, Holmes selected the *Van Wagenen Rate of Compresension Test.* (16) "This test is constructed on the validity-assumption that the faster a subject can detect the use of an absurd word within a relatively simple paragraph, the faster is his rate of reading comprehension." (10:25) The student indicates his rate by physically crossing out the absurd word in the second sentence of simple, 30 word paragraphs. Holmes and Singer offer no justification for the use of this rather novel approach to rate measure. They do however, report a reliability of .98 for the test. Unfortunately, there is no explanation of how this reliability was calculated. Presumably, it is based on some technique other than split-half correlation, which is quite inappropriate for speed tests. (7)

The Power of Reading criterion measure is the *Dvorak-Van Wagenen Test.* (5) This is a power test, with what Holmes and Singer call "Prima facie validity, insomuch as the student must read and understand the material and meaning of the paragraph" (Holmes and Singer, 1961, p. 26). Again, there is no explanation of why this particular test was used. Nor are we told why the 9th, 10th, 11th, and 12th grade subjects were tested on the Jr. form, designed for 7th, 8th, and 9th grades. It is germane to quote here from the conclusion of Holmes' college study. ". . . This writer . . . regards his final quantification of the per cent contribution to variance, only as valid first approximations and not finalities. Further, if the definition and criterion used in this study are changed, the variables contributing to its variance will also be changed." (Holmes, 1954, p. 81) In other words, if the students were tested on the Diagnostic Reading Test, Holmes may find a whole new set of substitute factors. Considering the ease with which another "criterion" measure could have been added to an already large test session, it is regrettable that we lack even this type of replication. In point of fact, there is no Substrata-Factor Theory of *Reading.* We have only the Substrata analysis of specific tests.

In summary then, the representativeness of the samples, the possibility for systematic measurement error, and the selection of the criteria all are grounds for questioning the data base of the major Substrata-Factor Theory studies to date. There is, however, a fourth and more pervasive data level problem with Substrata-Factor Theory—its statistical methodology.

The fundamental ideas are not as complex as the resulting Substrata-Factor flowsheets (Holmes and Singer, 1961). One starts with a criterion (speed or comprehension) and a large battery of relevant tests. Holmes searched the literature to find any measure which had previously been found to predict reading ability (Holmes, 1954). A sample of students are measured for speed and comprehension, and then take the tests selected on the basis of Holmes' survey. These measures and the criterion are all intercorrelated. A computer is programmed to select the one test from the intercorrelation matrix which best correlates with the criterion. Then the next best test is selected and added to the first. The multiple correlation with the criterion is thereby increased. This process of selecting tests is continued until the addition of one more predictor does not increase the multiple correlation significantly (Garrett, 1958). Thus from a set of 54 tests, we pick out the 6 which best predict speed in a high school sample with a multiple correlation of .73 (Holmes, 1961). But the multiple correlation does not tell the actual score each student earned on the rate criterion. The 6 predictors give a "best guess" for each student, a predicted score we call P. Each student has an actual score on the rate criterion, which we will call C. If in all cases the predicted P is the same as the observed C, the multiple correlation is 1.00. But this is never the case; there is always some difference, or variance, between P and C for all the students.

The variance or difference between P and C is due to several factors. First, it is the result of individual differences in reading rate. Thus much of the variance is called true or valid variance. The rest is due to differences between students on such things as motivation to do well on the test, fatigue, boredom, personal problems, and unreliability of the predictor tests. This part of the variance is usually called residual or error variance. Holmes applies accepted statistical techniques to conclude what part of the P-C difference is valid variance, and what amount of that valid proportion is accounted for by each of the predictors. (The proportion of valid variance is the sum of the beta weight times the zero order correlation for each predictor.) For example, in the high school sample referred to above, 55% of the variance in speed was due to true differences in rate, and a measure of visual verbal meaning (a sub-scale from the SRA Primary Mental Abilities Test by Thurstone) accounted for 17% of it. The reasoning is extended to the rest of the first level predictors, selected by a standard multiple regression analysis.

But the Substrata-Factor analysis does not stop at this point. Using what is called the Wherry-Doolittle-Holmes method, it precedes two more levels. Each of the first level predictors, selected out of the original matrix, is used as a criterion for another prediction equation. Thus, in the rate analysis referred to above, tests in the original matrix were found that correlated with three of the six level I predictors. And again these three multiple correlations could be broken down into proportions of true and error variances. The process is repeated to level III. In each case, the accounted for true variance at each level is offered to explain the true variance for the level above it. It is precisely this "trickle up" explanation that raises an important data base problem.

The methodological question is whether the true variance in the second and third level prediction is the same as the true variance in the initial criterion. The second and third level predictors may account for that part of the variance which is unrelated to speed or power of reading, i.e., error variance. Indeed, the original Wherry-Doolittle Test selection method was designed to extract from the matrix only those tests which had valid overlap with the final criterion (Garrett, 1958). In a sense it was designed to throw out the bath water but keep the baby. The further analysis of the prediction tests, by the Wherry-Doolittle-Holmes procedure, may or may not be methodologically sound. There is no evidence to support the assumption that the true variance of the Substrata-Factors overlap the true variance of criterion.

Perhaps another analogy would make the situation clearer. Let's move to the field of gold panning. The gold miner throws a shovel full of mixed gravel into the pan and then sloshes it around in an attempt to spin out the light-weight pebbles, but keep the heavier gold flecks. He continues the procedure until he refines the total matrix of minerals down to heavy black sand, and a few specks of gold, which he removes. By analogy, he has extracted gold, or true variance, from the sand, or error. At this point the miner stops. However, the substrata theorist continues the process. He scoops up the light-weight material cast off by the initial separation and repans it. If he has done a good job the first time, he will get a separation of minerals (tests) by weight (variance), but no new gold. The second and third level substrata are mere regroupings of error variances into clusters of overlap. They have nothing new to contribute to the prediction of reading ability.

I would summarize my dissenting view of the data base of Substrata-Factor Theory as follows: The unrepresentative samples, the possibility for measurement error, and the unexplained choice of entries are all problems for previous studies. But the major problem at this level is the utilization of what may well be over analyzed error variance as a basis for theory erection. This is a pervasive problem for the theorist, which can not be handled by a change of methodology or an improved design. Let us now turn to the concepts of the dynamic "model" of reaching which is the major justification for the substitute factor effort.

THE THEORETICAL TERMS OF SUBSTRATA-FACTOR THEORY

There are 10 key abstractions or concepts offered as part of Substrata-Factor Theory (Holmes, 1961). I have listed them in three groups because it seems to me that they can be logically clustered in that way.

1. a. Audio-, visual-, and kinesthetic-modalities
    b. Nature, sequence and scope of information input
    c. Associative conceptualizations stimulated by the activity-of-perception
    d. Intra-cerebral communication or working system

e. Mutual and reciprocal causation
f. Gradient shift and its attendant alteration of the hierarchy of the working system
g. Initial kick differential with accrued amplification from feedback which results in variation in output

This first cluster of concepts seems to me to be mere neurocybernetic jargon for the assumption that stimuli impinge on end organs, move around the nervous system in complex ways and produce various outputs. No direct evidence is offered for any of the above concepts, with the exception of the gradient shift. Operationally the shift, as far as I can make out, is a shorthand term for the changed multiple correlations in various age groups (Holmes, 1954). Basically the same tests account for different amounts of variance when measuring different students at different ages. I find the initial kick and differential feedback concept particularly intriguing. Unfortunately, I must have missed the particular finding from which it was abstracted.

2. a. Substrata Factors, or psychoeducatonal subsets of information stored in neurological subsystems of cell assemblies
   b. Interfacilitation of Substrata Factors

This pair of concepts seems to give a specific neurological locus for a specific substrata factor, or cluster of multiple correlations. It is not clear to me whether this is to be interpreted as meaning that a certain set of stimulus words always fires off a certain set of cell assemblies that are in some way cross connected. I find it hard to believe that that is what the concepts "mean." It seems to me quite improbable that the first time a reader saw the word "aardvark" a particular neuron fired, and that same neuron fired for every succeeding appearance of the word. It strikes me as even more unlikely that such extreme specificity of brain function could be isomorphically mapped into a multiple correlation cluster. There is just too much error in our reading tests to justify these two concepts.

3. Mobilizers arising from the focusing of deep-seated separate value systems

This mobilizer concept has some experimental foundation in a study of spelling and personality factors (Holmes, 1959). In discussing the very small amount of valid variance in spelling related to personality factors, Holmes presents the idea of a subconscious, constitutional, educable trait which catalyzes other abilities. He posits a spelling personality. It seems to me curious to elevate a lack of empirical relationship to the status of a hypothetical construct, and then specify its possible locus in the cerebral unconscious. It is even more curious to endow the mobilizer with telephone operator functions, which allow it to interconnect deep-seated value and working systems.

We see then that Substrata-Factor Theory has a data base of extensive but perhaps unrationalized tests, combined in a "trickle up" system of error variance. These relations are the soil for a virtual thicket of neologisms asserting unsupported dynamics protecting a hypothetical construct (mobilizers) of extreme excess meaning. If we apply Occam's razor and Morgan's Canon to cut and shoot our way through the jungle, we seem to be left with the following defensible summary of Substrata-Factor Theory:

A specific visual and perhaps auditory stimulus shows wide ranges of individual differences in output. It is possible to account for some of that variance in output with multiple correlation techniques. As yet no attempts are reported to experimentally manipulate the empirically valid predictors to produce specified changes in the criterion response.

One final point of dissent, perhaps the most crucial. The Substrata-Factor Theory presents a dynamic picture of mental activities. "At one moment the reader may organize a working system to recognize a word, at another instant to associate meaning to the word, and at still another time to integrate, transform or to encode ideas for an overt response" (Singer, 1965).

Unfortunately, it is logically impossible to support this description of time-dependent states with a single measure of the system. There must, at the very least, be two checks of the variables. Moreover, there must be some outside demonstration that the measures are taken when the reader is indeed recognizing, associating, integrating, or whatever. Clearly, one can't make statements about momentary fluctuations when one check of the system takes five hours of test time. The whole set of concepts and sentences regarding cognitive dynamics, then, are not only non-parsimonious, they are logically and scientifically meaningless, however much they may have emotional appeal.

SUMMARY

Many of the problems with Substrata-Factor Theory can be solved by revision of data collection tecniques, and by more discipline in the naming of theoretical constructs. But there are two very fundamental questions that must be answered before the whole body of research can be taken seriously:

1. What evidence is there that the second and third level factors are not mere reshuffling of error variance, unrelated to the major criterion?
2. How can statements about an individual's momentarily shifting cognitive activity logically be supported by data from a single test? The course of any change should never be extrapolated from one datum point.

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Some Psychological Aspects of Mental Content and Their Relation to Reading

Homer L. J. Carter and Dorothy J. McGinnis
Western Michigan University

There are three important variables in psychology with which the teacher of reading is concerned. These are Stimulus, Organism and Response. Some psychologists give more attention to stimulus and others stress the value of response. The writers of this paper wish to emphasize the importance of the organism and of the internal changes in the learner. They are concerned not only with the stimulus-response dogma but with the processes which can contribute to the response. The writers intend to use the time-honored psychological term, mental content, in their discussion of the interacting processes leading to the response. They wish to review briefly the history of the construct, mental content, and consider the mediating activities in the learning process. The relation of mental content to reading will be emphasized.

BRIEF HISTORY OF MENTAL CONTENT

Mental content is that of which one is aware at any moment and which can be reported. It is an integration of conscious experiences rather than an accumulation of various elements. It has affective as well as cognitive characteristics. The term, mental content, has a long psychological history and was given attention by the Subject-Object psychologists such as Brentano, Witasek and Ward. Subject-Object psychology may be defined as a subjective, purposive and hormic consideration of the activity of mind or its behavioral manifestations. From Act psychology, the Subject-Object psychologists have borrowed the concept of the ego or mind which they consider as active and dynamic. British Associational psychology had considered the mind as a passive "tabula rasa," a sequence of elements such as impressions, sensations, images, and ideas actually constituting mental content. For Witasek, the subject matter of psychology is not the mental act with its reference alone, but *act* and *content* (Akt, Inhalt), and transitive reference. The following illustration may make clear the point of view of Witasek.

Act	Content or *Mental Qualities*	*Object*
I see	squareness	o o o o

In this instance squareness is seen because of previous eperience which resulted in mental content. This reference is called transitive objectivity and for Witasek is the criterion of psychological study.

Wundt, the exponent of Structuralism, emphasized the value of experience and pointed out that mental content is made up of *sensations*, *images* and *affections* which are added to or subsracted from the apperceptive field. Wertheimer, who sponsored Gestalt psychology, made use of mental content in his explanation of the perception of movement. The phi phenomenon related to closure is the experience of movement derived from perceiving two slits of light turned on and off alternately at a given rate. Here there is not a one-to-one relationship between stimulus and response for there is little in the stimulus to provide the experience of motion. The organism has had to contribute something, and that something is said to be mental content. Insofar as content psychology is concerned, there is a constancy between stimulus and mental content.

According to Wundt, the father of Structuralism, mental content is developed by adding and subtracting elements to form a "mosaic." Gestalt psychology, however, shows that elements of consciousness are integrated and not merely accumulated. One cannot build a mental mosaic from atoms of conscious content as a mason builds a floor for a patio, stone by stone. Instead there are properties constituting the whole creation which are not present in the individual parts. The chemical analogy was first used by John Stuart Mill to show these "supra-summative" characteristics. Water, for example, has properties not found in hydrogen and oxygen, its constituent elements. Gestalt theory points out that all the elements of the organism are dynamically interrelated and that in organismic activity the individual cannot be isolated from his environment.

Mental content was the chief target of Behaviorism which denied its existence or at least its scientific validity. Much of the older content theory is now being rejuvenated in terms of response-oriented psychology and is becoming more scientific in its application. The neobehaviorist recognizes modification within the organism but points out that this change cannot be measured and consequently does not permit scientific investigation. Responses, on the other hand, can be identified, evaluated and summarized for statistical analysis.

NEED OF WORKABLE THEORY

Observations and investigations show that in the classroom the individual's responses to stimuli in language-art situations are not entirely automatic and mechanical in nature but are dependent on social, cultural and personality factors which the student brings to the learning situation. Studies by McGinnis and Carter (1, 6) indicate that parental attitudes of superior and inferior readers at both the elementary and college levels are related to reading achievement. Both studies show the importance of home background and the necessity for development of mental content and experiential background. It is obvious that in any classroom the same stimulus can be applied to the whole group and yet the responses will be entirely different. This has been well exemplified by Kingston (5) when he found six separate and distinct interpretations of a nursery rhyme consisting only of four lines. Something is needed to explain the variance in response. Is it logical to say that rate of learning is the only significant explanation? If this is true, what is the function of the teacher? If reading is only a tendency, as Skinner points out, how can this tendency be studied, evaluated and increased? Must the teacher be concerned only with the stimulus-response dogma? In attempting to discover a workable theory it may be well to set forth a concept of reading which makes use of mental content and Gestalt theory.

WHAT IS READING?

Reading may be defined as an active and purposeful process of identifying, interpreting and evaluating concepts in terms of the mental content of the respondent. One can read without the use of words, sentences or paragraphs. For example, the well-trained scout can read the signs of the trail. The telegrapher can read messages sent to him by means of dots and dashes. The effective psychologist can read the reactions of those he is observing. The physician identifies, interprets and evaluates the reactions and symptoms of his patient. He integrates symptoms from all available sources and reads his patient "like a book." Reading is more than the pronunciation of words or the mechanical recital of ideas. It is a pursuit for meaning and requires experiential background or mental content. In fact, meaning is directly proportionate to the kind and amount of mental content available at the instant the act of reading takes place. Reading involves the skills of identification, interpretation and evaluation. These skills are not added to the individual's repertoire of behavior but become integrated into a functional gestalt.

This theory of reading can be expressed in terms of three configurations: $\frac{S}{M}$, $\frac{S}{M^2}$, $\frac{S}{M^3}$. Here S represents any symbol, and M represents mental content. In identification the symbol is identified in terms of the reader's mental content, that is, $\frac{S}{M}$. In interpretation that which has been identified is interpreted in terms of mental content. Mathematically, $\frac{\frac{S}{M}}{M}$ becomes $\frac{S}{M^2}$. In evaluation that which has been interpreted is evaluated in terms of mental content. Mathematically, $\frac{\frac{S}{M^2}}{M}$

becomes $\frac{S}{M^3}$. Reading then can be expressed as a function of $\frac{S}{M}$, $\frac{S}{M^2}$, $\frac{S}{M^3}$. These configurations lose their individual identities and emerge as reading.

It may be well to apply this theory of reading to the following sentence .

The printer inserted a quad at the proper
place in the line of type.

In reading this sentence, the word *quad* must be identified, interpreted and evaluated in terms of the experiential background of the respondent. For most individuals this identification is quite simple. Interpretation, however, is more difficult and requires additional mental content. An individual may interpret the word *quad* in many ways. For example, he may interpret it as a block of type metal. He may interpret it as land surrounded by four buildings. He may interpret it as one of four children born at one birth. In evaluating the term in its setting even more mental content is required. The individual must select from many meanings the one which is most appropriate and best fits the pattern of the sentence. Obviously, the interpretation of *quad* as a block of type metal used in spacing meets all of the essential requirements.

This illustration shows how the three aspects of reading, that is identification $(\frac{S}{M})$, interpretation $(\frac{S}{M^2})$ and evaluation $(\frac{S}{M^3})$, become integrated and lose their unit properties as reading emerges. This theory of reading can describe, in part, some of the internal processes of the organism as the act of reading develops. It can be utilized in explaining why some reading disabilities occur and why some individuals make rapid progress and others little, if any. Mental content is a crucial factor, for the individual sees with what he has seen and he experiences with what he has experienced. High degrees of mental content lead to high degrees of meaning. The S-R dictum is not entirely sufficient.

IMPLICATIONS OF THEORY FOR TEACHING OF READING

The teacher of reading at all levels must be concerned with providing adequate stimuli in the form of dynamic teaching and wise choice of materials. He must focus his attention upon the individual through observations, interviews, academic history and testing procedures. He must be able to interpret the individual's responses for these can be measured, classified and evaluated with varying degrees of confidence. Surely no machine or highly structured program primarily concerned with stimulus-response can accomplish all of these objectives.

It can be assumed that the teacher of reading will make effective use of the stimuli applied to his students and that he will interpret carefully their varied responses. This paper, however, suggests that greater attention should be directed to the individual himself, for the only learning which influences behavior is self-discovered and self-appropriated learning. Attention must be focused upon the organism for

- In any act of reading mental content determines what the individual is to see, understand and feel.
- The individual's interest is an aspect of mental content.
- The individual's states of anxiety are aspects of mental content.
- Degrees of mental content determine degrees of readiness on the part of the individual for reading.

The successful teacher must interpret the student's response as well as evaluate it. His objective should be to determine why the individual reacted and responded in a given manner. The Gestalt theorist recognizes the difficulty of interpreting the phenomenon which takes place within the learner. He believes, however, that much is to be gained by investigating attitudes, perceptions, motives, transfer, concept formation and other manifestations of mediating changes within the organism. In these areas there is need for well-designed and well-controlled research, for new instruments and new techniques will be required by the teachers of tomorrow. It may be possible that a combined projective and psychogalvanic response technique can be employed in the investigation of certain learning and reading acts.

Mental content is utilized in the acts of speaking, writing, listening and reading. Teachers are well aware that many intelligent students are unable to "see" and "hear" concepts expressed in their textbooks and in classrooms. In certain areas their perceptual quotient is quite inadequate for conceptualization is the result of experience. It is the responsibility of the teacher to develop concepts in the field of instruction before the student can be expected to read and listen intelligently. This can be accomplished, for example, by well-planned excursions to the local dairy, fire station, manufacturing plants, governmental agencies, nature centers, hatcheries, radio and television stations. Class demonstrations and the use of audio-visual materials can provide valuable experiences which can add to the background of the observer. Stimulating discussions by members of the class can contribute to the mental content of each student by the sharing of experiential background. This integration of concepts is essential to the development of readiness for learning.

The successful teacher must do more than provide information and worthwhile experiences. His theory of reading will determine how he will teach reading. The teacher who accepts the theory presented in this paper will stimulate and guide his students to more reading, more activity, more problem solving and more achievement. This success, in turn, provides more stimulation and an ever-increasing and ever-expanding process. Stimulation is essential, response is a requirement but the most important of all is the organism, the individual.

SUMMARY

The writers of this paper have attempted to emphasize the importance of mental content in the act of reading. The history and some psychological aspects of mental content have been discussed. The writers have suggested a theory of reading which utilizes mental content and is based upon Gestalt psychology. Some implications of this theory to the teaching of reading have been presented.

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Independent Reading Growth as a Factor of Classroom Social Organization[1]

Robert S. Soar
Temple University

It is widely believed, although without much support from research, that the social environment of the classroom should make a difference in the amount and perhaps the kind of learning that takes place in it. This report stems from a project which is examining the relationship between the behavior of teacher and pupils in the elementary classroom, and changes in pupils in subject matter achievement as well as a number of personal and social characteristics.

The relation of two dimensions of classroom behavior to pupil growth in vocabulary and reading during the academic year was reported to the International Reading Association last May (13). In the course of that analysis, examples emerged of pupil growth during the summer as compared with school year growth, which prompted further analysis of the effect of classroom environment.

STATEMENT OF THE PROBLEM

This study examines differences in growth in reading and vocabulary during the summer in relation to differences in the social environment of the classroom during the preceding academic year.

RELATED LITERATURE

If it is assumed that teaching which is "good" in the sense of producing pupil growth in the classroom will also be "good" in the sense of starting a learning process which will continue outside the classroom, then the same literature which was cited in the earlier report will be relevant to this study, and will be reviewed only briefly.

Support for the idea that a permissive classroom environment fosters growth in reading skills has come from studies by Delacato and Delacato (4), and Perkins (10). On the other hand, Medley and Mitzel (9) found only a slight relationship between emotional climate and growth in reading.

The relation of the classroom to other kinds of learning has been supported by Amidon and Flanders (1) for geometry, and McKeachie's review (7) of college teaching studies concluded that pupil-centered procedures were more likely to produce learning beyond simple acquisition of knowledge than were instructor-centered methods.

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There is some support for the relationship between the nature of the classroom and the learning produced, but the aspects of the classroom studied appear to have differed from report to report. All appear to have involved aspects of emotional climate or teacher control, or both, however. Support for the existence of these as discrete dimensions has emerged from factor analytic study of small group effectiveness, in which two factors were found which sound very much like these (5).

The work on the relation between anxiety and learning appears to provide a useful set of ideas for explaining the relationship between learning and classroom atmosphere. Castaneda, Palermo, and McCandless (3) found that high anxious pupils learned easy material more rapidly than low anxious, but low anxious pupils learned difficult material more rapidly than the high anxious. Similar conclusions emerged from reviews by Runkel (11) and by Sarason (12). The conclusion from these studies appears to be that the more complex the learning task, the lower the level of anxiety that will interfere with it.

THE STUDY

Procedure. This is a longitudinal study of pupil growth over two years—grades 5 and 6—in eleven classrooms from three schools, in neighborhoods middle class and up. The *Iowa Tests of Basic Skills*, Vocabulary and Reading Subtests, were administered by project staff fall and spring of the first year, and spring of the second year. Testing was not planned for the fall of the second year, but a school testing program using the same tests provided scores at this point. From these data, relative growth for the two school-years and the intervening summer was obtained. During the school year, teacher-pupil behavior in the classroom was observed using two observation schedules—the *Interaction Analysis* (2), and another schedule made up of items from several revisions of the *Observation Schedule and Record* (8, and private communication), and the *Hostility-Affection Schedule* (6).

Following the finding of the small group research on dimensions that differentiate groups, two dimensions were sought by factor analysis of the observation schedules which reflected differences in division of responsibility between teacher and pupils and the emotional climate of the classroom. These were identified as "control" and "climate." The control dimension was measured by the Revised I/D Ratio for Rows 8 and 9 of the *Interaction Analysis*, which is made up of teacher behaviors which occur immediately after a pupil stops talking. Such responses as praise or encouragement, accepting feeling, or accepting or using a student idea are identified as indirect—that is, they have the effect of expanding pupil freedom. Those of criticism, justification of authority and giving directions are classed as direct teacher behavior in that they tend to limit pupil freedom.

The clearest emotional climate dimension in the analysis was made up of expressions of hostility, criticism, and negative feeling. These were occurrences of pupil hostility, both verbal and non-verbal, such as teasing, threatening, blaming, hitting, and taking another's property; and counts of teacher verbal hostile behavior such as threatening, humiliating, blaming, and reproving. The score was the incidence of critical or hostile behaviors in the classroom in a standard series of time samples.

In the study reported earlier relating classroom climate and control to growth during the academic year, four classrooms were selected from each grade level, three through six, representing the extreme combinations of climate and control. In the present study, data were available for growth during the summer between the fifth and sixth grade for three of the original four classrooms, and a replacement for the fourth was selected on the same basis.

A residual gain score was calculated for each child for both academic years and for the summer, removing both regression effect and the effect of initial standing, so as to make each score as independent as possible of effects other than the classroom. Differences in growth between classrooms for the first academic year were examined by a three factor analysis of variance for climate, control, and grade level, and results reported; for the present study, the effects of climate and control on summer growth were examined by a two factor analysis of variance.

RESULTS AND DISCUSSION

Results. The results for vocabulary partly conformed to expectation, but in part did not (see Table I). Differences in emotional cli-

TABLE I

Analysis of Variance for Vocabulary Summer Growth[a] for Two Classroom Behavior Dimensions

Source	df	MS	F
A Hostility	1	.06	-
B Control	1	98.1	4.22*
AXB	1	.85	-
Error	68	23.22	
Total	71		

* $P < .05$

Mean Gain[a] by Classroom Behavior Dimension

		Teacher Control		
		Direct	Indirect	Total
	High	3.00	5.58	4.22
Hostility	Low	3.21	5.36	3.96
	Total	3.12	5.51	4.11

a Residual gain scores, in months.

17.

mate for the preceding year's classroom produced no significant differences in growth over the summer, but differences in teacher control produced a significant difference in favor of indirect control—the children in direct classrooms grew slightly more than three months during the summer, while pupils from indirect classrooms grew five and a half. The interaction of the two factors was not significant.

For reading, emotional climate, control, and interaction were all non-significant as shown in Table 2. The only differences in growth large enough to be of any possible interest were differences between cells of the analysis, in which somewhat higher growth occurred for the combinations of low hostility direct and high hostility indirect than for the other two combinations, although these differences may be chance ones.

TABLE 2

Analysis of Variance[a] for Reading Summer Growth for Two Behavior Dimensions

Source	df	MS	F
A Hostility	1	.02	-
B Control	1	3.22	-
AxB	1	23.41	-
Error	68	13.39	
Total	71		

Mean Gain[a] by Classroom Behavior Dimension

		Teacher Control		
		Direct	Indirect	Total
	High	2.80	3.37	3.07
Hostility	Low	3.71	1.90	3.09
	Total	3.26	2.83	3.08

a Residual gain scores, in months.

The relative gain for the summer as compared to each of the academic years is shown in grade level norms in Table 3, and in residual gain in grade level months in Table 4. Although the results differ

TABLE 3

Longitudinal Results for Two Years of Growth*

	FALL		SPRING	
	$\bar{X}$	SD	$\bar{X}$	SD
	Fifth Grade			
Vocabulary	63.6	14.17	71.5	15.89
Reading	62.9	14.54	69.5	17.88
	Sixth Grade			
	SPRING		FALL	
	$\bar{X}$	SD	$\bar{X}$	SD
Vocabulary	75.5	16.92	83.2	16.17
Reading	73.0	15.18	79.7	15.65

* N = 189

TABLE 4
Residual Gain for Three Periods fo Growth*

	Fifth Grade Fall-Spring		Summer		Sixth Grade Fall-Spring	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Vocabulary	8.1	4.84	4.0	5.14	7.2	4.23
Reading	6.4	6.95	3.5	4.05	6.9	4.13

*N = 189

somewhat from one to the other, in general the relative growth for vocabulary was approximately 8 months for the first year, four months for the intervening summer, and 7½ months for the second year. For reading, the same periods show approximately 6½, 3½, and 6½ months.

DISCUSSION

The finding that indirect teaching produced significantly higher vocabulary growth the following summer follows the same pattern as for growth during the year. The significantly higher growth associated with low hostility which was found for the academic year was not found for the subsequent summer, however; nor was the significant interaction in which indirect teaching and low hostility produced the maximum of growth. It is interesting that at least one aspect of teaching which fostered growth during the year fostered continued growth following the classroom experience.

It is not certain why indirect teacher control produced more learning during the summer—whether the experience of greater pupil involvement in the classroom led to later learning, or whether the freedom and openness in examining ideas was the supportive element, or both. But it seems reasonable to hypothesize that the independence of the pupil might be even more important to the growth—and continued growth—of the college level student or adult.

Although the results for reading were not statistically significant, they followed the pattern for growth during the year in some respects. During the year, indirect teacher control produced more growth than direct, but this effect was not shown during the summer. The emotional climate dimension did not produce significant differences in either case. The largest difference in learning during the year was in the joint effect of climate and control (significant beyond the one per cent level), and although the interaction was not significant for summer gain, the pattern was the same. The direction of this difference appears to require an interpretation which is more complex than a simple summative effect of two optimal conditions. The findings for the year were interpreted by a *post hoc* hypothesis which dealt with two problems—why the results for reading and vocabulary differed, and why presumed less-than-optimal combinations of conditions produced the greatest growth in reading. That interpretation was made by referring to the finding of simpler learning being facilitated by moderate levels of tension which hindered more complex learning. This required the assumption that reading, as measured in the *Iowa Tests of Basic Skills*, was a less complex function than vocabulary. Although this is not an easy assumption to accept, examination of the tests makes it seem plausible. Vocabulary items appear often to deal with abstractions (few of the words are nouns, for example), whereas the reading items are relatively concrete and require only memory of details. If this assumption were accepted, the interpretation would then follow that reading skills as tested here were sufficiently less abstract as to be facilitated by a somewhat higher level of tension than was vocabulary. An additional relevant bit of information is that knowledgeable observers agreed that these were schools with more supportive emotional climate and more indirect control than many. If, then, either the schools had been less supportive (in general, more tension producing for pupils), or if the reading test had been more abstract, results might have been found for reading which followed the pattern found for vocabulary.

Although the dimensions of climate and control failed to produce significant differences in the summer learning for reading, the joint effect of the two conditions produced patterns of differences (greater learning for low hostile direct teaching and for high hostile, indirect teaching), similar to those for learning during the school year.

Perhaps as interesting as the analyses of the effects of the classroom on independent pupil growth, are the patterns of growth for summer versus two school years shown by the total group of pupils. Interest in this aspect of the study was initiated in the investigator by a parental concern for the pattern of growth shown by a boy who began the fifth grade reading at the 88 level, with vocabulary at the 91 level. Typical proud parental attitudes led to high hopes for rapid growth during a year with an excellent teacher. Year-end results which showed two months growth in reading and five in vocabulary were disappointing, to say the least. Results the following fall were surprising in showing seven months of growth in each for a summer spent primarily in assembling models and playing in the neighborhood. At the end of the sixth grade, again with an excellent teacher, he showed no growth in vocabulary and four months in reading. The concept of the standard error of measurement was somewhat supportive during this period, but the question remained as to whether there might be some meaning in the pattern. This led to collection of the data reported in Tables 3 and 4, and to a search for examples of other children with the same growth trends.

In interpreting the tables, the relative amount of growth shown for the summer as contrasted to the two school years needs some qualification. The schedule for testing did not permit encompassing the whole nine months of the school year between tests—rather the period was approximately seven months. The summer, then, covered about five months which included the opening and closing month of two school years. In addition, the year began with a review of the previous year's work which presumably resulted in an advantage for the fall testing which followed. It is possible, as well, that the second fall testing which was done by the classroom teacher rather than an outsider, may have resulted in somewhat higher scores, because of a less stressful situation.

Despite all of these questions, it still seemed quite possible that a significant amount of growth took place during the summer months, and the variability associated with the summer growth suggested that there were a number of pupils who grew as much or more during the summer than during the school year. Therefore, a count was made of individual children whose summer gain was as much or more than their previous year's gain, with the finding that this was true for 33 per cent of the group for vocabulary and 43 per cent for reading. A portion of each of these percentages presumably represents unreliability of measurement (as well as the factors cited above) but the differences in means, which are not so influenced, suggest that some of the cases are patterns of growth similar to the one which first raised the question.

Perhaps we can posit two groups of learners (probably the extremes of a continuum)—the conventional learner who does most of his learning in the classroom under the teacher's direction, and another (my wife calls him the "sneaky learner" because he learns when we're not looking) who does most of his learning during the summer on his own.

As a way of examining this question, we carried out another analysis which correlated vocabulary and reading growth (in residual gain scores as before) for each of the three periods. Our prediction was that if pupils really differ in their preferred mode of learning, we should find positive correlations between vocabulary and reading within each time period, and between the first year and the second year, but that both years should correlate negatively with summer growth. This analysis produced 15 correlation coefficients, every one of which was in the predicted direction. This is a result which could occur by chance less than one time in a thousand, as indicated by the sign test.

And perhaps the finding of summer growth should not be surprising since educators have always expressed the hope of initiating a learning process which will be continued beyond formal schooling. The possibility that practically important amounts of growth for some pupils may occur outside the school year raises some provocative questions, however. Lacking information about summer growth, as the school usually does, is it not likely that a pupil following such a pattern would be labeled an "underachiever"?

Is it possible that some children are more self-directed learners than others and so continue learning on their own during the summer?

Is it possible that some children find the classroom a source of stimulation which later results in growth, but requires a period of time for something like integration, synthesis, or consolidation?

Is it possible that a part of the progressive falling behind which is typical of the culturally deprived child occurs because of lack of environmental support for out-of-school learning?

Is it possible that the concept of good teaching needs more emphasis placed on the potential of the classroom for initiating learning which continues later? This has been a part of theory, but what concern has it received in empirical studies? In teacher evaluation? Should this be even more important for the college teacher?

Is it possible that kids learn when we're not looking? I suppose we all assume it, but don't take it seriously, or perhaps don't take advantage of it. Perhaps it requires more serious consideration than it is given.

SUMMARY AND CONCLUSIONS

Data were recorded for the longitudinal growth of 189 fifth-sixth grade children in vocabulary and reading. Significance of differences in growth during the summer months were tested for four classrooms representing the extremes of direct and indirect teacher control and of emotional climate. Indirect teacher control was found to produce more growth the following summer for vocabulary, but no other significant differences were found. Patterns of growth, though non-significant, showed parallels with patterns for growth during the previous school year which were found to be significant in a previous study.

Relative growth for the summer in comparison to the two academic years was reported and although questions of interpretation were raised, the likelihood of significant summer growth for some pupils was cited. Questions implied by this possibility were asked but not answered.

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Comprehension and Some Linguistic Fallacies

M. D. Jenkinson
University of Alberta

The part of reading behaviour which we term "comprehension" is still imperfectly understood though much has been written about it. There appear, however, to be two schools of thought on the nature of reading comprehension and the complexity of the factors which are involved. Several writers recently have suggested that comprehension in reading is perhaps not as complex as has been depicted frequently. (3) On the other hand, for many writers who stress the problems involved in developing comprehensive comprehension and the intricacy of the variables reading has become almost a mystique. (7) I suspect, however, that somewhere between the two extremes will be found ideas that will be most fruitful in helping teachers aid students in understanding what they read more efficiently and effectively.

Of recent years linguists and psycho-linguists have become increasingly vocal about reading problems from the point of view of the science and operation of language. Their ideas are many and varied and have had a salutary, almost abrasive effect on reading specialists. The purpose of this paper is to examine critically some of the suggestions that have emanated from these two fields in the light of what we know about reading and reading development. No solutions are going to be presented nor am I going to give any practical help to teachers of reading comprehension. I shall only examine the problems that have been raised by linguists. These are not capable of easy solution, but by pondering these concepts and their application to the field of reading we might serve a dual purpose, not only of communication, but also of clarifying ideas for teaching this particularly important aspect of the reading program.

MEANING AND LINGUISTS

Meaning has a special place in the teaching of linguistics. The linguists suggest that language is built at least upon two systems, phonology and grammar. Phonology identifies the characteristic sound features of English, the consonants, the vowels, the stress, and the intonation, the basic unit of this being the phoneme. Grammar, on the other hand, is the system built on meaning units, the morphemes and their relationships to words and groups of words. They also emphasize the interdependencies and interconnectedness of phonology and grammar.

Gleason has recently suggested that there is a third system which he has called semology. (5) He suggests that meaning is built into the language structure. This meaning regardless of the experiential background of the reader is limited by the patterns and systems of the language itself. For example, semology is that part which is concerned with the necessity in the English language of making every noun either singular or plural. We are forced, for example, to assign a singular number to an abstract concept such as "duty," "honesty" and so on. Is there any reason why these words should not in fact be plural for they frequently denote more that are action? Another aspect of semology is the sense organization which is built into the language and which Gleason illustrates by contrasting "sleeping car" with "sleeping dog." This type of shift of meaning of words which look identical and which are placed in conjunction to the things which they are describing is an important feature of English.

The recognition of the meaning organized within the language structure itself is a comparatively recent acknowledgement within the science of linguistics. Even today many linguists would still agree with Francis when he writes that

> The structural grammarian is concerned with meanings, of course. But his concern is with how the forms of language are used to express meaning. Meaning is, as it were, the end product; therefore, it cannot be part of the process (4)

For the teacher of reading meaning must be both an end product and a process. It is in the light of the *process* that some of the suggestions made by linguists in the past few years about the teaching of reading will be examined. The point of departure is the relationship between the spoken and written language.

THE RELATIONSHIP BETWEEN THE SPOKEN AND WRITTEN LANGUAGE

The stress which the linguists have placed upon the fact that oral language is the primary form has been salutary in alerting teachers to the similarities and differences between the spoken and the written word. The following quotation from Carroll (5:337) illustrates this idea.

> The behavior we call *reading* may be described as the perception and comprehension of written messages in a manner paralleling that of the corresponding spoken messages. That is to say, just as speakers of a language can comprehend spoken messages, persons who have learned to read can comprehend written messages. Comprehension of spoken and of written messages are not entirely independent processes, however.
>
> The speech communities of many languages have developed conventional systems whereby spoken messages can be recorded in written, visual form. Not all the features of spoken messages are normally represented in the writing system (although special transcription systems can be devised to represent all the meaning-bearing elements of spoken messages), but enough of them are symbolized to permit competent speakers of the language (who can also read) to reconstruct the spoken form of a written message in most of its important features. Writing systems usually contain certain elements of their own which do not correspond explicitly to anything in spoken messages (e.g. paragraphing, punctuation, capitalization, and different ways of writing items which are phonemically identical (as hair—hare). Many

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> written messages are composed, transmitted, and read with very little involvement of overt speech, but *construction of a spoken form is always possible.*

The systems mentioned previously of phonology, grammar and semology are operating in both the spoken and written language. However, the concept underlying this passage involves an assumption that is not always germane when we are teaching reading, particularly at the high school level. The assumption is that the structure of the spoken and written communication is the same in all relevant respects.

Even a cursory examination of the structure of written material shows considerable differences. The linguists themselves are pointing to the great range and variety of this differentiation within sentence structures. The sentences in the written materials of textbooks often contain deeply embedded ideas and meanings and other elements which are unfamiliar to the student in spoken language.

The following tend to greater frequency in the written form of the language than in the oral:

more passives
greater variety of tense formations
genitive structures
post positional noun modifiers
nominalizations
verbalizations
greater variety of adjectival phrases
greater variety of subordinate phrases
phrases in apposition
and so on.

As well as the suggestions above, the printed materials contain logical and subordinate connectives used with greater frequency and these often are the underpinnings of greater sentence complexity. The intellectual processes involved in holding ideas in subordination or in apposition which is required for these types of materials may be quite different from those involved in oral communication. We need to do considerable research on this. Some of it is already under way, but little as yet has been done either by linguists or by those interested in reading.

Furthermore, the texts from which we expect students to gain ideas and knowledge will tend to be more compact, more logical than verbatim utterances because the ideas themselves are more complex and therefore cannot be always as easily conveyed in the rather fragmentary type of structures such as are prevalent in speech.

Moreover, it is not clear what the linguists mean when they use the term "oral communication." After all we have a wide range of types of oral communication from the broken, short, fragmentary exchanges of conservation to the listening to erudite lectures in polished prose.

It is, however, interesting that it is easy to detect when a speaker is reading a lecture or speaking extempore! This brings me to my next area of major concern in examining these concepts of the linguists and that is the problems involved in oral reconstruction.

THE PROBLEMS IN ORAL RECONSTRUCTION

Discussion of this aspect of the problem again springs from another quotation of Carroll. He states that

> The activity of reading can, therefore, be analyzed into two processes: (a) on the basis of the written message, the construction or reconstruction of a spoken message or of some internal representation of it; (b) the comprehension of messages so constructed (3:338).

This idea has led to a widespread assumption among several writers and linguists that the reconstruction of the spoken message for the purposes of understanding the written matter necessitates the duplication and sometimes the oral production of the rhythms of speech, the stress, the intonation, the juncture. (8) The corollary of this assumption is further that if these oral features are included, comprehension will be automatic. Again we have little evidence for either of these basic assumptions.

The idea that reading comprehension will be improved, or automatically results from, reading aloud has been mooted many times previously in the history of reading. There is ample evidence, however, that even if the printed word is "heard" or read aloud, comprehension does not result inevitably. There is undoubtedly a germ of truth in this idea but we need to probe a little further to see wherein lie the differences between the spoken and written message, as they are placed before students in the school situation.

Some of the problems that arise because of the more complex nature of the written, formal language have already been indicated. But the *type* of communication also becomes important here. In many written communications conversation is recorded *verbatim*. Thus in plays, in novels, in short stories, character is often revealed through the written reproduction of the words spoken. But the clues which the reader has to the character of the speaker are quite other than the clues which are given in the written form. Consider for example, the following conversation:

"Look at that bird."
"I can't see it."
"It's in the grass near the tree."
"Oh, yes."
"The cat's watching it too."
"Will she catch it?"

Compare this with the following possible report of the incident.

The bird cowered in the long grass, so camouflaged that the children could hardly see it. The cat, however, was stalking her prey, ready to pounce at the most opportune moment.

This description is not verbose merely for the sake of adding a literary flavour (though this may happen too). The additional concepts are included to compensate for the fact that in the real situation, the children would be apprehending many ideas simultaneously with their speech. They would notice the bird was difficult to distinguish from its surroundings, and the attitude of the cat would suggest its intentions. The reported message not only conveys additional information but also is obviously more difficut. The clues to meaning in both these types of communication differ very greatly.

This, however, brings up one other point of the problem: in the written word there are not only fewer and more hidden, latent clues to meaning but for the most part the reader is accepting the thoughts of others with little feed-back from his own concepts of the meaning. This lack of feed-back may be a very important fact. It results in major difficulties for many readers.

Another feature of oral communication is that not only does the voice give clues, but there is a greater tendency here for redundancy and repetition than in the printed word. Perhaps this is because of the comparative stability of the printed medium as opposed to the rather more ephemeral quality of the spoken word.

There tends to be a wider range of types of content in printed material than in the material that is spoken. Since the advent of radio and television a good deal of description is given vocally, which is intended to rouse the imagination, yet printed matter more than the spoken word contains a profundity of logical, abstruse ideas. Consequently, the printed material calls into play usually a wider variety of cognitive abilities. Thus we find the need to analyze, to judge, to synthesize, to generalize, to solve problems, to make both inductive and deductive inferences and conclusions more consistently in reading than listening. Again, it may be true there are occasions where judgment can be based upon the oral record, as in trial by jury. But the majority of the learning to which we expose children is not of this type. Moreover, it would seem that this ability to reconstruct the written word depends upon the development and extensiveness of the language repertoire of the individual.

THE DEVELOPMENT OF THE LANGUAGE REPERTOIRE

Knowledge of the developmental aspect of language has increased greatly through recent research. Studies have revealed that spoken language development reaches considerable maturity in terms of the types of word forms and patterns used, even before the child enters school. There is indication too, that by the end of the elementary school the child has reached considerable maturity in language manipulation. (6) This has led some writers to declare that we must immediately revise our reading texts at the elementary level in terms of the introduction of more complex sentences and complex ideas. (12) However, we have to reconcile some of these findings with those that have the comparatively slow maturation of thinking, particularly when thinking is allied with language. There is ample evidence that though they can "encode" spoken messages, they have greater difficulty in the receptive aspect of understanding the objective and impersonal communications of print. The great body of the work of Piaget (9) and his many followers in Europe and on this continent shows that though children may use language, this very use often camouflages their lack, or their inadequacies of concept development. They can use the vocabulary and grammatical structures of adults but they are often encoding very primitive concepts. Thus we find that the use of many of the connectives, the "empty" words of the English language may not reach full maturity again until about the age of twelve years. The exact meaning of the following structure words demand precision of thinking:

1) cause and effect "because," "since," "so that,"
2) those which suggest condition "if," "unless," "although,"
3) those that indicate contrast "whereas," "while,"
4) those that state time relationships "as," "before," "when," "after," "during," "while," etc.
5) those which introduce parallel ideas "however," "therefore," "nevertheless," "hence," "accordingly," "similarly," "on the other hand," "in conclusion," and so on.

The child may have used these words in his speech, but confusion as to their exact meaning results in many errors in comprehension.

The confrontation of printed matter which demands that the child decodes the symbol but also understands the concept behind the symbol means that the reader must again become involved in diverse cognitive abilities. By the time students reach high school it is true that many of these basic concepts will be understood by the majority of students. There may, however, be many who are still lagging in this development.

An additional problem arises when we expect students to understand words when they read which are not in their speech repertoire and probably will never be so. Thus we are forced again to consider the work of the sociologist, Bernstein and his associates, who in the past five years have been emphasizing the nature of informal and formal language. (2) Many of our children rarely hear formal language spoken. It is perhaps this aspect which we need to scrutinize more fully than heretofore in connection with the so-called culturally different child. There is ample evidence that children from a sub-standard language background or a minority dialect are handicapped in schools and particularly in reading and comprehension. These students appear to be handicapped not only linguistically and academically but there are hazards of social and emotional adjustment as well. The difference between the formal language of text books and the informal language of normal speech has long been recognized but at the high school level we cannot afford to ignore the problems that this may create for students from particular types of background.

Much research needs to be undertaken to ascertain what are the problems faced by students ill-equipped to cope with formal language in terms of the development of their cognitive patterns of thinking. The work in language development and cognition has largely been limited to the developmental aspects in the earlier grades. We need to begin to explore problems which arise when there are serious lags or serious gaps in this development, which appear to have a devastating effect upon all aspects of learning as well as reading by the high school level.

CONCLUSION

Language is not only the root and branch of communication, in today's schools it is still the main tree of knowledge—and likely to remain so. The increasing understanding of language growth and development must be utilized by all who are concerned about the teaching of reading. Myra Perrings, a poet, has crystallized this thinking when she wrote (11)

> To learn your language, I must hear you speak,
> not only with an ear intent on sound,
> but with a tractored consciousness,
> a well plowed ground
> prepared for seed.
> As one perceives
> on first impression only outer leaves
> on alien plants, I am aware
> of unfamiliar verbal foliage,
> exotic growth of syllables,
> accents of color strangely placed
> in fields of syntax seemingly untillable.
> If I would learn your language, I must know
> my own.

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A Psycholinguistic View of Reading Comprehension

Kenneth S. Goodman
Wayne State University

In this paper I will discuss my view of how reading comprehension is achieved in the proficient reader. Reading comprehension I consider as interaction between thought and language. Since my concern is with the process by which comprehension is achieved, the subject of this paper is really comprehending.

To begin, let me state the case for considering reading comprehension a psycholinguistic process. Let's start with the simple statement that through reading the reader acquires meaning from written language. This means that the reader goes from written language, visually perceived, toward a reconstruction of a message which had been encoded in written language by the writer. In a basic sense, the extent to which his reconstructed message agrees with the writer's intended message is the extent to which he has comprehended.

To reconstruct the message, the reader must decode from language. This means that he must know and use the language in pretty much the same way that the writer knows and uses it. It also means that he must have sufficient experience and conceptual development so that the message will be comprehensible to him. The process of reading comprehension differs from the process of listening comprehnesion only in the form of the perceptual input. The latter works from aural input; the former from visual input. At some point, for the proficient reader oral and written language have become equivalent and parallel systems. He can recode from one to the other with ease. (5)

Somehow in comprehending written language the reader finds in an array of graphic marks, familiar patterned cues, signals and symbols which rapidly call forth previously acquired associations, experiences and concepts. Language in its written form stimulates and becomes the medium of thought. Language information is gleaned from written language; grammatical and semantic associations are called forth and the distillation evokes a thought process which results in some version of a reconstructed message. It results in much more, of course, because the reader will follow directions, encode an oral or written response, anticipate what he will find as he reads further or think away and beyond what he has comprehended of the author's meaning, spiralling on occasional tangents or leaping intuitively ahead.

It's apparent then that to understand this psycholinguistic process of reading comprehension we must deal with language as a system and thought as a system and the complex interactions between them as the reader comprehends.

LANGUAGE AS SYSTEM

That language is systematic has been well known by man since the ancient Greeks first began to study grammar. Yet the ways in which the systematic nature of language make it possible for meaning to be communicated have only recently and partially been explored. Strangely, in the study of reading and reading comprehension we have tended to treat written language as a chain of letters marching across the page from left to right with an occasional blank space or punctuation mark making an appearance. We've been concerned with the symbols but not the systems of their arrangement. The latter we dismiss under the vague heading of content. This is comparable to saying Morse code is a series of dots and dashes. Yet it is only when the dots and dashes are arranged systematically in patterns interrupted by long and short silences that they can become a useable code.

If we confine our attention to graphic symbols and ignore language systems then we see letters as representing oral words, but we ignore the grammatical cue systems which make it possible for these bits and scraps to carry a meaningful message from the writer to the reader. To put it bluntly, letters and written words may not carry a message to be comprehended; only full language may be comprehended.

I'm not now, nor have I ever been, a linguist so even if time permitted I wouldn't try to present a short course in linguistics here, but I will outline the syntactic cues which the reader responds to as he reads so that you will know what I mean later when I speak of syntactic information. The most important syntactic cue system in English is pattern. There are a limited number of acceptable sentence patterns in English. These familiar patterns define much of the relationship of words and phrases to each other and to the total meaning of the sentence. In "*John punched George*," we know who threw the punch and who absorbed it by the position of the words in this familiar subject-verb-object pattern. If *John* were the victim the pattern would have to be reversed. Sentence pattern is the grammatical context within which the reader operates.

Two other sets of syntactic cues can be regarded to some extent as pattern markers. First, there is the system of inflectional cues, usually represented in English by suffixes which indicate the particular grammatical functions and variants of sentence elements; examples are the <s> and <es> endings on plural nouns and present tense verbs which go with third person singular subjects. In reading, these inflections not only signal specific grammatical information but serve to

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confirm, redundantly, the function of a word which its place in a pattern indicates. Thus, in *John loves Mary*, the position makes loves a verb and the suffix <s> confirms that.

The other set of cues which mark sentence patterns is composed of a relatively small number of high frequency words with little or no meaning. Usually called structure words or function words, these words are really syntactic signals that literally lay out the patterns and point to the meaning bearing elements. In the sentence "The boy is not wearing his shoes," *the, is, not,* and *his* are examples of function words. *The* and *his* are noun markers, *is* marks a verb, and *not* signals a negation of meaning. With the meaning bearing words removed and nonsense words substituted we can see how these pattern markers create a syntactic context. The ***kump*** is not ***flooping*** his ***binkles***. The pattern is so laid out that ***kump*** must be a noun; the subject of the sentence. More than one ***kump*** we speakers of English agree would be ***kumps***. Similarly, if a ***kump floops*** today, then tomorrow we will say, "***Yesterday he flooped***," or "***He was flooping***." And there is no doubt that his ***binkles*** and not the ***kump*** got ***flooped***.

Again note that no word can really be said to have a meaning to be comprehended except in a specific language context, because its meaning is always a combination of the dictionary or lexical meaning and the contextual meaning. How frequently when asked the meaning of a word do we have to say, "Use it in a sentence."

All speakers of the language, regardless of their degree of literacy, have the ability to use these syntactic cue systems. Nor is their ability to use them conditioned on the formal grammar and grammatical terminology they may have been taught in school. Recent studies of child language development indicate that the grammar of their language is acquired by children well before they begin school. (1, 2) Even non-literate adults have been using their knowledge of syntax to comprehend aural language all their lives.

The patterns of stress, pitch and juncture in oral language are also vital parts of listening comprehension. Punctuation marks perform the same function in written language, but only partially. The reader must either supply his own intonational cues or compensate in some other way for the cues not present in print.

There are two inter-related characteristics of language which contribute greatly to its comprehensibility. ***Redundancy*** has a special meaning in communications theory which refers to the lavish, rather wasteful ways that language provides cues to the same bit of information. In a sentence like "The girls *are* doing *their* homework," three cues carry the same bit of information, that is the plural nature of the subject. This is uneconomical in the sense that the maximum information can be transmitted if each bit of information is carried by only one cue. But it makes the reader or listener less dependent on exact perception of every sound, letter, signal or pattern. He can miss some cues or be selective in the cues he uses and still comprehend.

Sequential constraint is a term for the phenomenon in language that limits the possibility of every language element following every other with equal probability. It seems to be a universal characteristic of every aspect of every language. If we go through a page of text we will find that all 26 letters do not occur with equal frequency after *a*. Some do not occur at all. Some are rare. Some are common. Some are highly frequent. Similarly, the constraints on sounds following each other also vary in probability. We may also speak of word constraints, grammatical function constraints, pattern constraints and so on. Some of these constraints are common to many languages, but there seem to be few universals. A non-existent sequence in English may be common in Serbian, Ashanti, or Japanese. Sequential frequencies are not the same for such closely related languages as English, French, Spanish or German. Think, for example of the frequency with which noun follows adjective or adjective follows noun in these different languages. Sequential constraint makes it possible for users of language to anticipate, with great accuracy, language elements that they have not yet heard or seen. Again it frees them of the need for slow precise perception and makes comprehension a rapid largely intuitive process. The abilities of readers to read mutilated or blurred print, to fill in blanks in cloze tasks, or to read at speeds which exceed the capacity of eye and brain to process all available language information are largely due to the twin phenomena of redundancy and sequential constraint.

Sequential constraints in English sounds and spellings are at least as important as the association between letters and sounds but they've been almost completely ignored in reading instruction.

Recent studies by Jones and Carterette (3, 4) have researched redundancy and constraint in letters and phonemes and provided valuable information. Redundancy and constraint in other language aspects seem to be largely unexplored.

TENTATIVE INFORMATION PROCESSING

With that much background let me state what I consider to be a key hypothesis relating to the process by which written language is comprehended.

Hypothesis: Reading comprehension results from a series of tentative decisions made on the basis of partial use of available language cues.

The key words in this hypothesis are *tentative* and *partial*. Tentative decisions are informed guesses. These guesses are either confirmed or contradicted by subsequent guesses. If there are inconsistencies the reader regresses, gathers more information, and refines his still tentative decision. The frame against which he keeps testing, of course, is

"Does this make sense?"; that is, "Is the message I am reconstructing comprehensible?"

A corollary hypothesis is that the more efficient and skillful the reader is the less will be the number of cues he uses in comprehending what he reads. Speed in reading involves skill in selecting the most useful cues and an intuitive ability to be right the first time. Research in perceptual psychology has indicated that average adult readers cannot possibly process all the available information as fast as they read with good comprehension. (7)

Training for better and more rapid reading comprehension, seen in this light, is not a matter of getting people to read more precisely and carefully but getting them to select more productive cues and to use them to make better first guesses.

THREE SIMULTANEOUS SYSTEMS

The information which the reader processes as he is comprehending is of three different kinds and comes from three separate but interlocking systems. The first kind of information we can call grapho-phonic; the second kind is syntactic; and the third is semantic. I define phonics as the system of relationships between the spelling patterns of written language and the sound patterns of oral language. A literate user of language may use graphic information, phonological information or phonic information. All this I label grapho-phonic. Going from written to oral language or from oral to written language is really a process of recoding from one code to another parallel code and as such does not relate directly to comprehension which must involve some level of decoding for meaning. There are times, even for a proficient adult reader, when he must recode from an unfamiliar written word or phrase to the oral equivalent before he can comprehend, but this is a rather rare circumstance. There are also times when the proficient reader is more familiar with the written form of a word or phrase and must recode the oral form as the written form before he can recognize and decode it.

My own research leads me to the conclusion that even oral reading is not a simple matter of going directly from written language to oral language for most proficient readers. Most readers do much more silent reading than oral reading. They decode largely from written language to meaning as they read. Oral reading for them is a matter of decoding from written language and then encoding the meaning they have reconstructed as oral output. This is evidenced by a great deal of grammatical transformation and rephrasing and vocabulary changes in the resulting oral reading. It is the exceptional proficient reader who has cultivated the ability to recode rapidly and accurately from written to oral language as he simultaneously decodes for meaning. (6)

Of course the reader must discriminate among letters, graphic words and graphic phrases, but it is most likely that as he goes from print to meaning he perceives large language sequences as graphic wholes using the minimal cues.

I've already described in some detail the syntactic system and the syntactic information which the reader uses. Remember that some graphic words and word parts serve directly as syntactic cues.

Semantic information, a system of meanings, depends as much on the reader as it does on what he is reading. The writer has encoded meaning as written language. He has expressed thoughts, emotions, reactions, descriptions, facts which he has experienced and conceptualized. Perhaps, as in a note or letter he has carefully considered the particular reader for whom the message is intended. Perhaps comprehending the message depends on private meanings based in an experience which only the reader has shared with the writer. No one else can comprehend because no one else can bring to the reading the background necessary. Perhaps, on the other hand, the reader is someone unknown to the writer, distant in time or space or both. Still reader and writer must share a common experiential and conceptual base if the reader is to comprehend. However skillfully the writer has expressed meaning in language, the meaning is latent until the language is decoded, and it can only be decoded for meaning, comprehended, by a reader who not only is able to use the language but who has sufficient background to understand the message once it is decoded. Meaning exists not in the language but in the writer and the reader and, therefore, the semantic information comes from the reader himself. The language cues call from his storehouse of knowledge the real and abstract referents, things, places, relationships, concepts, feelings, attitudes which his prior experience and learning have placed there. He may comprehend new meaning, acquire new knowledge, as he reads but only if he brings to the reading a sufficient semantic base.

Here is an example to illustrate this: I get a contract from a publisher which I read but I can only partially comprehend. I don't understand partly because words and phrases are unfamiliar to me, that is they arouse no meaning in me, and partly because some words or phrases seem to be used in a sense that is unfamiliar to me. I call my attorney who asks me to read the sections I don't understand to him. He comprehends quickly and easily. He explains the sections to me, using language which does carry meaning for me. He helps me to understand the legal concepts and referents by referring to experiences and concepts which I have had.

In this example I can handle the grapho-phonic and syntactic information but without the semantic information which the lawyer can supply from his legal training and experience I cannot comprehend.

Here is a simpler example. A junior high school boy is reading a job sheet in a print shop. It tells him how to print personal stationery. Every time he comes to the word *stationery* he must laboriously work it out, apparently using phonic information and some syntactic information. When he's finished reading he can describe the procedures in printing the personal stationery, but he does not know what he will be printing. Apparently he doesn't recognize either the written or aural form of stationery. It is not a familiar word. But the job sheet indicated that he would be printing the name and address of his mother or anyone he chose on the paper. Still he didn't understand. It must be that his experiences with any kind of stationery, and especially personal stationery, are so limited that he cannot conceive of the purpose of the task as it has been expressed in the job sheet.

Describing this boy's problem and my problem with the contract as vocabulary problems is not accurate. We don't just lack familiarity with words' definitions. Our problem is that we come to the reading with too limited a background and we cannot supply the semantic information which the writer expects us to supply. Comprehension is therefore not possible.

LANGUAGE GROWTH AND CONCEPTUAL GROWTH THROUGH READING

Comprehension is not only dependent on the immediate act of reading, but at any point of time it is the end product of a long chain of prior experiences, conceptual developments and language learning.

Reading is easy to comprehend if both the language and the meanings are already known to the reader. But when the reading involves new concepts or unfamiliar language expressions or both then comprehension is more complex. When new concepts are involved then comprehension is a matter of coming to know. E. B. Smith has identified three phases of coming to know: perceiving, conceptualizing, and presenting. (8) Perceptions are organized on the basis of the reader's prior concepts and tentative new concepts are formed. Language growth must accompany this conceptual growth, first because the reader must have language to encode his new concepts in his own thought processes as he develops them, and secondly because in the process of coming to know he must test his concepts by expressing them in language and presenting them for verification. The language he uses will tend to resemble the language he has decoded. This presenting phase of acquiring knowledge may take a form of a simple conversation, it may be in a student's paper for a course, a question or comment directed to a teacher, or a note written in the margin. But in any case the knowledge is not the reader's until he has presented it in language.

The reader may encounter language which is unfamiliar to him. This is a matter for the reader of translating into familiar language and decoding, or of equating unfamiliar language with familiar language. The problem is a linguistic one. An example might be a hot rod enthusiast who has a fine understanding of some complex aspects of internal combustion engines, but who has trouble with a technical magazine article because the language he uses to express his concepts is very different from the engineer's.

Language seems to grow by expansion rather than substitution. The communicative and expressive needs of the user of language cause him to add language to increase his effectiveness. New language is required to express new concepts or to express old ones in ways which are appropriate to new situations. The individual achieves flexibility with several parallel ways of expressing his ideas; eventually ineffective language falls into disuse and disappears.

Language growth, of course, cannot take place apart from experience and concept. If vocabulary building consists of working with words and definitions isolated from language, the result will tend to be useless and highly transient. It is even possible to manipulate language structures, working with grapho-phonic and syntactic information without any conceptual understanding. For example, take the high school student who answers the question at the end of the chapter [illegible] his history book by finding an appropriate section in the chapter and copying it as the answer. Or, take the college student who responds to the mid-term question: "List five causes of World War I," by regurgitating language whole and undigested from the text or his notes on the professor's lecture. In either case no meaning is involved and the language is quickly lost.

SUMMARY

I'm going to summarize by briefly describing the process of comprehending in the proficient reader as I view it.

The reader perceives print as large language units. He selects minimal grapho-phonic, syntactic, and semantic cues and makes tentative choices on the basis of these minimal cues. He continually tests his choices by attempting to decode an acceptable meaning; he goes back to gather more information as it is needed. In this process he utilizes all of his relevant past experiences, learning and language development.

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Reading Improvement Through Vocabulary Development: The CPD Formula

James I. Brown
University of Minnesota

As teachers of reading we are eager to provide every possible help to all our students. We would like to feel that what we do in class and what we assign for out-of-class work is of maximum benefit.

Obviously, for the teaching of reading there is no one method, universally used, but many approaches. This situation makes it imperative that we continually ask ourselves exactly what factors are most essential.

THE IMPORTANCE OF VOCABULARY

Where, for example, does vocabulary fit? How much direct attention should be given to vocabulary in a reading course or program at the high school, college, or adult level? And how much attention should be focused elsewhere?

We read with our eyes. This puts the development of perceptual skill into a position of major importance. We also read with our mind. Intelligence is important. But what can be done about that except to help each student reach his full potential?

Furthermore, we read with our experience. This puts the development and enrichment of background into a position of major importance. We know that two individuals of identical intelligence will usually differ in the amount and kind of experience with print and the surrounding world. Some quite intelligent individuals are supersaturated with print; others are literally print-starved—print poverty-stricken. What are the implications of this for our effective teaching of reading?

These are but a few of the many factors that we must evaluate if our teaching is to have genuine vitality and worth.

To return to vocabulary, what exactly do we read with our eyes, intelligence, and experience? We read *words*. To be sure, that is an oversimplification. Actually we teach students to read between the words, to observe their denotative and connotative values, to weigh and consider them, to savor them. The word *read* is used broadly here to include all such instructional goals, not narrowly, in the sense of just pronouncing or perceiving words. This would seem to put vocabulary up into a position of prime importance.

While this is so, pragmatically, is there any concrete evidence for such a position? Fortunately some recent research by Holmes in evolving the Substrata-Factor Theory is pertinent. (4)

Holmes explored thirty-seven factors reported to be closely related to reading, isolating those making a statistically significant and independent contribution to reading speed and power. Only thirteen of the original thirty-seven were identified as significant. They are listed in Table I, grouped to show their relative closeness to the usual concept of vocabulary: Group I—most closely related, Group II—next most closely related, and Group III—least closely related. A glance at the Table I will show that the two first-order factors contributing most to reading speed are "Word Discrimination" (28%) and "Word Sense"; (23%) the single factor contributing most to reading power is "Vocabulary in Context." (39%)

TABLE I

Factors Significantly Related to Reading Speed and Power(4 p. 120)

	SPEED			POWER		
	**3rd	2nd	1st	3rd	2nd	1st
Group I:						
1. Word Sense	*46%	25%	23%			
2. Word Discrimination		*28%	28%	27%		
3. Vocabulary in Context	23%	9%			*29%	39%
4. Vocabulary in Isolation				*36%	47%	
Group II:						
5. Perception of Verbal Rel.						8%
6. Prefixes					11%	
7. Suffixes				10%		
8. Spelling		18%				
9. Phonetics	27%			11%		
Group III:						
10. Span of Recognition	4%		5%			
11. Intelligence		20%				27%
12. General Information				16%	13%	
13. Fixations						4%
Unaccounted for			44%			22%

*Residuals

**Rank order of factors, e.g., 1st order factor

In short, common sense tells us that we read words; research corroborates that fact by providing concrete evidence of the close relationship between words and reading speed and power. Apparently if we wish to give maximum help to our students we must emphasize those very sub-skills which contribute most to reading speed and power.

THE NEED FOR A DYNAMIC ATTACK

If vocabulary is as important as it appears, we need, more than anything else, to develop a more dynamic approach to its mastery.

This means starting to think about vocabulary as we now think about reading—as multi-faceted. Just as we recognize many different kinds of reading, so we must begin to recognize the many different aspects of vocabulary. The research by Holmes is a step in this direction. Research to discover significant vocabulary factors must be followed by research into the best ways of teaching each skill isolated and measured so that it will contribute most fully to added reading speed and power.

THE VALUE OF A HYBRID APPROACH

In a corner of Bat Cave, New Mexico, archaeologists found a pile of corncobs believed to represent 4,000 years of feeding. Forty centuries with no improvement—cobs just as stunted as ever. Twenty-five years ago hardly one percent of the corn grown in this country was a hybrid variety. Today, well over ninety-five percent is hybrid. Why? Because plant scientists have learned how to combine the best characteristics from several varieties into a hybrid variety producing phenomenal yields.

Perhaps the best teaching of reading must be a hybrid approach, a fusing of the best from all the methods now known. The research by Holmes suggests that this may be so. Considerations of this kind led me to evolve a formula for vocabulary improvement, essentially hybrid in nature.

THE C P D FORMULA

The SQ3R Formula devised by Francis P. Robinson, (5) is perhaps the best known formula in the area of reading. It, like Einstein's $E=MC^2$, has a vital, dynamic character, recognized by students and teachers alike. Teaching students to raise questions, to survey, to review, to read and recite is not the same as teaching the SQ3R Formula. In other words, the whole is greater than the sum of its parts. It makes a significant difference how we, as teachers, put the essential ingredients together. Hopefully, the CPD Formula for the improvement of vocabulary has some of the same vitality as the others.

Now for the three elements—C, P, and D—with particular emphasis on the inter-relationships which fuse them into a single, dynamic whole.

The C: When students in an Efficient Reading class were asked what they should do when they came to an unfamiliar word in their reading, there was little disagreement. Eighty-four percent said, "Look it up in the dictionary." For most students, then, the CPD Formula will mean a break from the usual. To let them see why they should *not* begin with the dictionary they were asked to try the following vocabulary item:

Extenuate: 1) make thin, 2) weaken, 3) underestimate, 4) make less serious

When the students were told to check their answer with the dictionary, they discovered that all four meanings were right—were the four dictionary definitions.

Most words have more than one meaning. For the common word *fast*, for example, the dictionary lists not one but twenty-one separate definitions. Some are poles apart—"swift moving" and "firmly fastened," as in the sentence, "The fast horse is tied fast." Actually the 500 (1, p. 80) most common words in the English language have a total of 14,070 separate meanings—an average of 28 per word. For this reason, it is almost pointless to ask what any given word means; it all depends on context, on the way the author used the word. In short, unless the word has only one meaning, we must of necessity rely on context, not the dictionary, for the exact meaning intended. That is why the formula begins with Context.

Furthermore, students vary widely in their ability to use contextual clues. In one class, for example, a difficult vocabulary test was given, first without any context, next with a context for each word, helpful in arriving at a definition. Two students in the class made identical scores of thirty each, without context. The second time though, with context, one scored ninety, the other only forty. As evidenced by this example, some students have developed remarkable skill in using contextual clues, the skill deserving top priority.

The P: Back to the CPD Formula. While context determines meaning, it will not always reveal it. Take the sentence, "He had a predilection for novels." This meager context does not indicate whether he likes or dislikes them.

Here we make it a hybrid approach by turning to the second letter, which stands for Parts—specifically for a prefix, root, or suffix. When context is not enough, the reader should look for a familiar part which may help identify meaning. A student may not know what *predilection* means, but he should know the common meaning of the prefix *pre*—"before." This suggests that novels come "before" other types of reading or other activities and that he has a preference or liking for them.

When dealing with word parts it is particularly important for instruction to capitalize fully on the visual. Students must be helped in every possible way to see word parts, as they now see words. Without maximum help in visualizing, they remain blind or partially blind to them. Some of the research on the efficacy of the derivational approach has shown indifferent results, largely, perhaps, because of failure to provide adequate visual emphasis.

The D: The final letter in the formula stands for Dictionary. Since most reading programs include attention to one or more of these three elements, it is essential to look closely at the specific inter-relationships needed to fuse them into a dynamic whole—into a formula.

Here, individual involvement must be accented. The instruction must encourage the student to use context and knowledge of word parts to arrive at a tentative but specific definition of the unfamiliar word in question. He must be led to formulate by inference his own definition *before* checking in the dictionary. It should be a learning situation having the characteristic personal involvement and suspense of programmed instruction: "Is my response right?"

In short, only when we structure the first two steps in this way do we make the relationship a truly vital one. If he finds he is right, he has a real feeling of satisfaction—of accomplishment. If he finds he is wrong, he has an ideal opportunity to see exactly why and where he got off the track—what parts or clues were not properly observed or used.

Now you can see what happens when a student reaches *first* for a dictionary. He short circuits the very mental processes we, as teachers of reading, are trying to instill, knowing their key importance to his reading speed and power. Just as a short circuit wastes electricity, so reaching first for the dictionary, in a sense wastes brain power, dissipating not cultivating intellectual curiosity.

That, in brief, is the CPD Formula. It provides, as you see, a balanced approach. There are excellent books dealing with the dictionary, with words parts, and with context. But the problem is to fit all three elements into a single, dynamic relationship. That is the task facing the teacher. That is the task for which this formula is designed. How well does it work?

INITIAL EXPLORATIONS

Adult level: The new CPD Formula was first tried with an adult class in vocabulary improvement, a class running for eleven weeks, one 1½-hour session per week. Four experimental color films were used to introduce the formula. Thirty-four programmed units of from 25 to 27 frames each made up the bulk of the instruction. All units were presented with the overhead projector. (2, 3) For out-of-class work, seven dictionary study exercises were used.

A specially constructed CPD Test was administered both at the beginning and end of the course. Results were gratifying. The students improved five percent in effective use of context, 39 percent in effective handling of word parts, and 29 percent in their accurate use of the dictionary.

University level: Somewhat different explorations were made with two summer session classes in Efficient Reading to see more exactly what each of two aids seemed to contribute to mastery of word parts. In those classes one of the required texts is *Building a Better Vocabulary*. The two classes were randomly divided into three groups. Group I (18 cases) used *Pyramid*, a deck of cards designed to aid in visualizing parts, to supplement the text; Group II (18 cases) used *Programmed Vocabulary* as a supplement; Group III (17 cases) served as control, using neither aid—just the regular text.

Pre- and post-test results showed the following gains: Group I—125 points, Group II—110 points, and Group III—99 points. More specifically, *Pyramid* seemed to bring better results in *Memorization*

(26.11 vs. 25.55), *Identification* (37.22 vs .23.34), and *Application* (32.78 vs. 25.53) . *Programmed Vocabulary* seemed to bring best results in *Generalization* (35.56 vs. 28.89). (6)

It seems reasonable to expect *Pyramid,* a pure visualizing device, to help students most in "seeing" word parts, as in the *Identification* section of the test and in *Memorization*—flash cards being widely used for that purpose. And since both knowing the meaning and spotting the form are necessary in any practical application, the results here are to be expected. On the other hand, programmed instruction by its very nature encourages the student to generalize..

One final bit of evidence was of interest. Over the years during which *Building A Better Vocabulary* was used, summer classes have gained an average of 8.89 raw score points on the vocabulary portion of the *Nelson-Denny Reading Test.* With two-thirds of the students using a supplementary aid, the average gain this past summer was 10.23, the highest yet. When no vocabulary text was used, gains ranged from 1.97 to 5.58 on the average.

High School level: One research project focused on this kind of word-analysis at J. Sterling Morton High School, Berwyn, Illinois, funded under Senate Bill 749, State of Illinois. With 75 high school sophomores divided into experimental and control groups, an attempt was made to see if gifted children could, in a limited time, develop better word analysis techniques. For a half-hour a week, the experimental group worked in *Programmed Vocabulary.* At the end of the year, both groups were re-tested. The control group gained only 3.35, the experimental 14.04, a statistically significant difference on the 50-item, four-part test.

This new CPD Formula, like all other formulas, must be tried at various levels and with a variety of students and teachers before its value can be determined and before it can take its proper place in a repertoire of teaching devices. With that in mind, try it yourself. Test its vitality. See if it is a potent catalyst for whetting student interest in words and accelerating both reading speed and power.

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An Effective Secondary Level Program in Practical Reading for the Academically Disadvantaged

Owen Johnson

Beaufort High School, South Carolina

In October, 1960, the superintendent of schools for Beaufort County District One, Mr. J. M. Randel, Jr., initiated what is known locally as the Beaufort Reading Project: a plan to conduct a comprehensive reading program Grades I through XII, in all of the schools of the district in order to afford reading instruction to all students. The new feature in the program was the inclusion of a program in practical reading at the senior high school level.

The superintendent obtained the endorsement of the boards of education of both the district and the county. These education authorities and the legislative delegation set aside a special fund of fifty thousand dollars to underwrite the program. The district director of instruction was appointed to serve as coordinator. Consultants were the director, Dr. Paul Berg, and the assistant director, Miss Florence Nelson, of the Reading Clinic of the University of South Carolina.

In the Beaufort Senior High School the emphasis from the beginning was on involving all staff members and al students and that emphasis continues. Staff members were involved in the study of professional books that dealt with reading. These books were by such well known authors as Bamman, Blair, Bond and Tinker, Bullock, Dawson, Featherstone, Gray, Harris, Kirk, Simpson, Strang, and Spache,

COMMITMENTS

Out of this study four commitments, which have served as a nucleus of agreement, were made by the faculty in the fall of 1961. These commitments were (1) by subject area each teacher assumes the responsibility of teaching vocabulary that is appropriate to his or her subject field; (2) by departmental agreement the purposes for teaching will be incorporated in lesson planning; (3) by departmental agreement special skills that are needed to better teach reading will be emphasized; and (4) by departmental agreement library facilities will be examined and work assigned according to units of study. The program in practical reading involves students from ninth, tenth, eleventh, and twelfth grades. This presentation is confined to these certain students on the secondary level.

In the spring the junior high school sends to the guidance department of the senior high school test data and faculty recommendations concerning forty students who are to enter ninth grade in the fall and who rank lowest in overall reading achievement. These low achievers include students of lower intelligence levels and also pupils of higher intelligence levels who are not achieving to capacity.

At the end of the ninth grade through teacher evaluation and testing, the twenty lowest achievers are routed for a remedial section in the tenth grade. This pattern of selection continues, generally speaking, through the twelfth grade. Instances occur in which the student feels he could function better in an average section and this permission is sometimes granted. Likewise, students who request to be in practical reading classes may be given this preference, if and when vacancies occur.

Five conditions which we have deemed necessary for success are (1) provision, through block-type teaching, for students to have the same teacher for two consecutive periods; (2) setting of realistic goals in terms of student needs (release from "grade level" expectations); (3) a school climate favorable to the project including cooperative attitudes and help on the part of administrative personnel; (4) provision of special materials; (5) selection of a teacher trained and experienced on both the elementary and secondary levels.

The School Climate is favorable. Staff and students understand and accept the program. We think that we have been wise in the name used for the block. We have avoided the term "remedial" and earlier used the term "developmental reading and social studies." For purposes that are both constructive and comprehensive, we now call the program "Combined Studies." The sections are small enough and the teacher has them long enough to know the students. The double period permits the teacher to use whole group, small group, and individualized procedures in a more leisurely atmosphere than single periods afford. The favorable climate includes administratvie attitudes which give the teacher freedom to eplore and to adjust as the situation seems to require.

Another factor conditioning success has been the provision of an abundance of multilevel materials covering all areas of instruction. It would be hard to overemphasize the importance of these materials for such a program as ours.

SPECIAL READING TEACHER:

What kind of a teacher does it take? The person selected to initiate our program is certified for elementary teaching and for secondary teaching of English and social studies. She has had experience on both levels. Her elementary experience has created in her a respect for individual differences and a desire to provide for them—also a very real interest in the teaching of reading and opportunity to increase her competence in that field. Her high school training and experience have helped her to understand adolescents and adolescent behavior and to know the subject matter of her chosen fields. The other teachers more recently selected to work in the program meet high qualifications also, and are proficient in the teaching of reading.

PRACTICAL READING PROGRAM

After considerable time spent in the study of other reading programs, the plan for including reading in the curriculum was put in effect and commences with a three-week period of intensive study of the students, their problems, their likes, and dislikes. Among the methods used to gain helpful information are cumulative records, personal counselling, informal testing, and "revealing conversations." (These "revealing conversations" may seem entirely spontaneous to the students, but have been deliberately arranged by the teacher.) Classes are informal but orderly. Students seek a level at which they are comfortable and strive to become a part of the class activities. These are the students with previous cries of "I hate reading," "I always made bad," "I ain't gonna read today," "I can't find no book I like." These are the students who would not fit into average, academic, or honors clases. This they soon realize, accept, and strive to polish the pearls at their disposal and to be happy in the security that efforts made are understood and that rewards are more than they expected. Students are appreciated for what they really are. There is little effort made to set a far off picture of what the teacher expects them to become. Few deadlines are set—none to thwart them. Only one requirement, effort, is a "must." This is emphatic, sincere, and constant. During this three-week of teacher-student adjustment the class hub, reading, becomes important. From it experiences become more meaningful for each has found, or is seeking to find, comfortable performance through the multilevel materials that are used.

Early in the year, the teacher and students work out a plan for class work. It calls for maximum patience on the part of the teacher and a reversal of traditional patterns of thinking and practice. She helps each individual to see the schedule through and, if necessary, "hold his feet to the fire." All of the students are not happy, but because of the philosophy of teaching that the teacher holds, student attitudes, patterns and even habits change. The student jells into a more wholesome person, which is a major objective of the reading program.

The Motivation underlying the changes or replacement of attitudes is of major importance. The student must feel comfortable, successful, and, above all, acceptable by his teacher and peers. There are many combined practices that promote these feelings of acceptance. First and foremost is a daily recognition of success—success for the student in moving on from where he was. This success is the building material upon which the student proceeds toward future successes. He may never reach "grade level" but he knows he has progressed.

Students and teachers have found the following program most acceptable and beneficial: free reading, English, directed reading and social studies.

The Free Reading Time is just what the lay reader or the expert in reading would expect; the reader chooses his own book, or other reading material. The refining of tastes in selecting materials other than classroom ones, is encouraged, and, so far few choices have been frowned upon. A classrom library of multilevel reading materials is a "must" for students who are unable to meet their needs elsewhere. These materials range in reading level from the third to the tenth grade and are books of interest to high school students. The subjects covered are varied and are aimed toward student needs. The student keeps a daily free reading progress record. He, along with the teacher, sets up a goal of pages that he would like to try to read in class and at home during the nine weeks period. This must be a goal he can very likely reach. These goals extend upward during the nine weeks period. Surveys indicate that amounts usually vary from 300 to 3,000 pages during a nine weeks period. Informal discussions with the teacher about the books or articles read and "buzz" and "chat" sessions with classmates lend variety, interest, information, and help the students to expand their spheres of learning experiences. The teacher must seek avenues through which to learn as much as possible about the student. At times teacher circulates around the classroom and listens, questions, and converses with the student about himself, his book, his family, and his friends. If he has not accepted the class routine and is not enjoying the free reading time, an effort is made to find a spark that will kindle into a fire. The teacher's interest and appreciation must develop each student and at the same time become comparatively unimportant. She must understand and always be ready to help with all his problems (even if it's advice on selling his car) and be complimentary when he is successful, especially in reading. Any effort on the student's part must be accepted and the teacher must build on this. The teacher becomes a sturdy support for the student. He realizes the teacher is not a bear, or that she doesn't scold when he makes a mistake, or when he reads the small book with the big print. Thus, acceptance and appreciation are necessary and important for successful free reading moments.

The English Session lasts for approximately twenty minutes. The core of materials used for self-improvement and motivation is slanted toward the pupil's preparation for a vocation. The exercises and materials presented help the students to see the need and value of at least acceptable English usage in all fields of human relations. Many of the exercises are set up with directions for the student to correct them. This is important because he sees what he has been saying and realizes that just because he has been saying it does not make it acceptable or correct. Of course students write original sentences, too. The authors attempt to show a need for continuation of schooling until the student is fitted to live and work in society. These are problems that face slow learners and underachievers more vividly and less beautifully than more fortunate students. The units of work are correlated with their vocational interests, expanding upon the idea that the time for choice is close at hand. Some of the subunit topics studied are: investigating a job through research; living in a family; living with friends and neighbors; tastes in television; letters of request; manners for youth; the library card catalog; agreement of subject and verb; conversation and listening; improving newspaper reading; the order letter; the claim letter; and the employer and employees. To strengthen the basic text selected library sources are found successful: also newspapers, magazines, movies that urge the students to stay in school, guidance folders, pamphlets, and brochures.

Directed Reading focuses on the study and reteaching of skills needed for the practical reading and studying of many kinds of materials. Selected texts are designed to help the student by providing him with varied selections which he is likely to meet on any given school day. The skills provided for study are those needed to study literature, music, arithmetic, social studies, composition, vocabulary, vocational training, and current affairs. The selections range in difficulty from third to tenth grade. They are in varied lengths and have questions that give opportunities for improving comprehension ability and stimulate vocabulary growth. In addition to these varied texts, *Science Research Associates Reading Laboratories IIc,* and *IIIa* are used for directed reading. These are usually used during the ninth and tenth grades. The selections in the laboratories extend in difficulty from the third to the twelfth grades. Each difficulty level is marked with a different color. The students are pre-tested and placed in the appropriate color level and then follow a sequential program. Emphasis is on the *SQ3R* study plan which may be employed to study for content area subjects as well as reading. The materials are self-correcting and the student is involved in improving his weaknesses and using his strengths. The multilevel materials of the reading laboratory take care of all the students at one time and guide each to do his best so that he can move upward in reading improvement. The teacher is a guide for the student and helps as needed. Encouragement and commendation, when merited, are important as well as knowledge of the materials, if the teacher is to play her role as successfully as the student. This reading period is directed by the teacher and directed toward definite areas of student improvement.

Materials Used for Social Studies are varied and numerous. At the ninth-grade level, the basic geography text selected is written on the seventh-grade level and its topics include multiple solutions to man's physical, social, and spiritual needs. This text along with *Junior Review*, a publication of Civic Education Press serves as the basis for improving citizenship and understanding the universal needs of mankind at the tenth and eleventh grade levels. World history and United States history written especially for slow learners is supplemented with *Scope Magazine* published by Scholastic Magazines. At the twelfth grade American government and Citizenship are taught through texts that are easily read and understood. *Scope Magazine* supplements these subjects, also. The *World Book, Britannica Junior Encyclopedia*, and *Comptons* are used for research and are housed in the classrooms. These serve as reinforcement and help to arouse curiosity and encourage initiative. Social studies' reading skills are one part of overall reading improvement. With this idea present the block-type classroom period becomes less fragmented and more interlocked.

RESULTS:

The aim of the slowlearner-lowachiever program in practical reading is self-improvement for purposeful living through the personal experiences of reading. Each year about one hundred students are involved in these personal experiences. The major groups that are best fitted to measure the progress toward attaining the goal of self-improvement are the students, the teachers and staff, and the community. Each group has received certain benefits that are measures of success. The students' benefit include: (1) the special reading groups understand the need for improvement in reading; (2) the students diligently strive to finish high school; (3) the students are happy because assignments are geared to their abilities; (4) the students have better school spirit in other developmental areas; (5) average and advanced students have more teacher time. The benefits to the teachers and staff include (1) a vivid awareness of problems that face students with reading difficulties; (2) inter-school use of materials, ideas, and suggestions of the reading department; (3) the pride of the staff in the successes of the combined studies students; (4) the recognition of reading problems by content area teachers is evidenced in differentiated asignments; (5) the improved school citizenship and achievement is conducive to improved adult citizenship and living standards; (6) drop-outs have decreased from 38 in 1959-60, to 23 in 1962-63 to 21 in 1963-64 to *20* in 1964-65 even though enrollment has expanded from 720 to 1,097; (7) upon applying the Reading Expectance Formula (years in school x IQ) plus 1.0=Expected Reading Grade the results show that fifteen out of sixteen seniors involved in the program have reached or exceeded their potentials.

FUTURE EXPECTATIONS

Since the days of the *New England Primer* we have had the feeling that, somehow, reading can help create a virtuous life. Almost three hundred years after the *Primer* perhaps the goal is a good one. With the students, faculty and staff and the community receiving benefits, the program in practical reading of Beaufort High seems to have become an integral part of the curriculum. The challenges that face us are many. With sympathetic teachers, supervisors, and administrators, further growth of the program is assured.

A Televised Speed-Reading Experiment

Dan Dramer

Central High School District No. 2
Nassau County, New York

INTRODUCTION

The video-taped program, *Read with Speed*, was the result of two forces operating in our high school district. One force was our reading specialists' desire to provide an extra measure of reading help to college-bound seniors. The second force was the existence of a district-operated television facility which linked our six secondary schools with three micro-wave TV channels complete with thirty-five millimeter video tape recorders. The recorders, much like the familiar tape recorders for aural reproduction, provide an instantaneous transcription of both image and sound which may be played back immediately and re-used indefinitely.

Although our TV studio has been in operation for some time prior to the start of the reading program, definite proof of the effectiveness of televised instruction was lacking. The question posed by chief administrator John W. Nicoll: "Could the reading department put on a short program on some aspect of reading improvement whose results would be manifest immediately?" The answer to this question was patently evident to our reading specialists—a program of reading speed improvement for college-bound seniors. They had been able to offer such a program in the past, but only to a few dozen of the hundreds of pupils we were sending off to college each year. Moreover, since an evaluation was sought, a speed reading program would be easy to measure by pre-test/post-test scores. Furthermore, a production schedule had been established which called for the completion of the entire video-taped series in just a couple of months. A program for college-bound seniors could assume that they had no serious word attack or comprehension problems, and since speed was to be the goal, a generous portion of commercially-filmed speed reading selections could be incorporated into the series.

THE PROGRAM

The number of sessions for the taped program was set at fifteen since one of our goals was to determine whether a measurable gain in reading rate could be established by a short exposure to TV instruction. Since the first lesson was to be an introduction/orientation session, and since the second and last telecasts of the series were to be given over to pre-testing and end-testing respectively of reading speed, there were left only twelve actual teaching sessions—a scant dozen lessons in which to introduce skills, affect attitudes, build confidence and provide practice in reading at accelerated rates. A number of mechanical/administrative reasons dictated that each lesson be limited to thirty minutes in length. Thus the amount of time available for actual instruction came to a total of six hours.

EDL (Educational Developmental Laboratories) granted us permission to televise the films used with the Controlled Reader, a reading pacing device which permits projecting at almost infinitely variable rates reading selections published on special film-strips. The problem was to select the grade level difficulty of the films to be shown, and since the TV series was to be irrevocably committed to tape, to determine the final rate in words per minute that it was reasonable to expect these high school seniors to attain, and the increments in speed at which they could reach it. It was decided that no amount of manipulation could provide us with a single speed or a single grade level of reading difficulty for the selections which would challenge the best seniors in our group without frustrating their less able, albeit still college-bound classmates. The only fair and workable solution seemed to lie in dividing the television pupils into two groups which would read materials of different difficulty and at two different rates of speed. The different levels of readability were provided by *Controlled Reader Selections IJ* (intended for grade levels nine and ten) for the poorer readers, and *Controlled Reader Selections KL* (for eleventh and twelfth grade levels) for the better readers. Both groups saw a selection from each series during each lesson, and each pupil chose the level at which he would operate. Each lesson consisted typically of:

1. A lesson on some aspect of reading; *i.e.:* presentation of a new skill, a suggestion for improving rate, et cetera
2. Presentation of a Controlled Reader selection from the *IJ* series (the lower level) at a high rate of speed
3. Comprehension checks on the film from the EDL *Controlled Reader Study Guide*. These questions were taken (at this time) only by the higher group of pupils who saw the film just this once at a high rate of speed. During this time when the higher group was taking the questions on the selection from the easier of the two series . . .
4. The pupils of the lower were concurrently seeing (for their second time, of course) the film from the lower series, this time at a much slower rate. This slower reading group had not joined the faster group in taking the questions earlier. These slower readers were told that the original, faster showing should be regarded as a preview and the second, slower reading as their actual reading of the selection.

5. After this second presentation, the slower group proceeded to answer the questions testing comprehension of the film, while simultaneously . . .
6. The faster group (which had answered their questions after the film's first showing) proceeded to see the more difficult selections from the *KL* series at a still more accelerated rate.

(Thus, the showing of the Controlled Reader selections consisted of showing an easy selection once at a rapid rate and again at a slower rate for the slower group; for the higher group, two different selections were shown, one of them a difficult one, and both of them at a rapid rate.)

7. Presentation of the correct answers. Self-scoring by the pupils. Graphing of the results.

The rates at which the films were shown followed this schedule:

LESSON NUMBER	IJ SERIES FIRST SHOWING (Seen by high and low groups)	IJ SERIES SECOND SHOWING (Seen by lower group only)	KL SERIES (Shown once only to the lower group)
3	300 wpm	180 wpm	330 wpm
4	330 wpm	210 wpm	360 wpm
5	360 wpm	210 wpm	390 wpm
6	390 wpm	240 wpm	420 wpm
7	420 wpm	270 wpm	450 wpm
8	450 wpm	270 wpm	480 wpm
9	480 wpm	270 wpm	510 wpm
10	510 wpm	300 wpm	540 wpm
11	540 wpm	300 wpm	570 wpm
12	570 wpm	330 wpm	600 wpm
13	600 wpm	330 wpm	630 wpm
14	630 wpm	360 wpm	

Thus, the finishing rate of the lower group (360 wpm) was only a little in excess of the starting rate of the higher group (300 wpm). Youngsters in both groups, however, doubled their rates in the course of the twelve teaching sessions.

For morale purposes, the faster group was referred to as the Accelerated Group and the slower group was euphemistically titled the Regular Group. It was suggested that pupils select their group on the basis of their eperiences during the program itself rather than on test scores, prveious grades in English, or the like. No grouping was attempted till after the third televised lesson, by which time the students had scored themselves on three television-connected exercises.

The two groups joined for the "reading lesson" which comprised the first part of each session. These lessons were very short at the beginning of the series while, toward the end, they formed the bulk of each thirty-minute telecast. Since each Controlled Reader selection is of almost exactly the same length, and since during the course of the series the rate at which they were projected doubled, an increasingly broader wedge of time became available for the "reading lesson" portion of each telecast. The lessons covered the following topics:

1. Eye-movement photography and what it tells us about reading (one short lesson)
2. Reading patterns; an analysis of the rhetorical organization of paragraphs and articles (four short lessons)
3. Suggestions for home practice in speed reading; exercises for improving reading speed (one medium-length lesson)
4. Vocabulary development; James Brown's Fourteen Master Words (two long sessions)
5. Previewing; surveying and skimming techniques (one long lesson).
6. Determining an author's mood, tone, purpose, and point-of-view (one long lesson).

Material for these exercises was typed, with a primer typewriter, six words to the line, and placed on a large studio-type rolling drum which permitted the cameras' closing in on three lines of type at a time. The drum would then be revolved slowly, gradually bringing succeeding lines of type into view until the entire piece was presented serially.

These lessons were presented to a studio class consisting of two senior boys and two senior girls. They actually participated in the give and take of a learning situation, and in so doing provided a change of voice and face in the presentation and permitted the camera operators (students under the direction of a teacher-director) to do single shots and group shots, close-ups, zooms, changes of camera angles, and the like—all providing a change of pace. The Studio Class pupils actually read their Controlled Reader selections from a television monitor placed just outside of the cameras' range. Just as did the pupils watchnig over TV, the Studio Class actually grouped themselves, took all the comprehension checks when the members of their groups did, et cetera.

The Television Class consisted of four hundred and fifty volunteers who remained after school to improve their reading speed. The program's only prerequisite was that the pupils intended to go to college. The course was given on Tuesdays and Thursdays over a six-week period. Seventy-five youngsters were present for all fifteen sessions plus pre-program and after-program evaluation sessions.

Teachers volunteered (in most schools on a rotating basis) to proctor this after-school activity. Their only responsibility was to hand out and collect graphs and other materials. They had no special training in either TV work or reading. Each was furnished an over-all outline of the course and a detailed "run-down sheet" showing step-by-step procedure of each lesson.

RESULTS

Four kinds of data were considered in evaluating the program:

1. Pre-test/post-test scores of reading rate and accompanying comprehension checks on natural but timed reading of manuscripted material similar to the televised material used in the series.
2. Scores in speed and comprehension on the *Nelson-Denny Reading Test* given before the start of the series and given again in alternate form at its conclusion.
3. Questionnaires filled out by the students participating.
4. Questionnaires filled out by the teachers who proctored during the course of the series.

Test results show the following growth:

The group's average rate on the *Nelson-Denny Reading Test* advanced from a pre-instructional rate of 328 words per minute with comprehension at the seventy-sixth percentile for high school seniors, to 462 words per minute with comprehension at the eighty-second percentile.

The above scores serve to confirm the results of an informal measure of speed and comprehension given before the start of instruction and again at its conclusion. Two different Controlled Reader selections were alternately given to half the participating pupils as a pretest, then rotated and re-administered later as an end-test. Average performance advanced from 243 words per minute at 74% comprehension at the start of instruction, to 327 words per minute with 84% comprehension after training.

On the questionnaire evaluating the program, sixty-eight per cent of pupils completing the program stated that they would advise their friends to take the course, even if it required staying after school. Ninety-two per cent stated that they felt that they had improved their reading, and sixty-four per cent stated that their reading had improved substantially. Seventy-eight percent of pupils who had withdrawn from the course before its completion felt that they had achieved "some growth in reading." Twelve percent reported that they were "very satisfied" with their progress.

The questionnaire addressed to teachers who had proctored the program was much shorter; it simply solicited their recommendation as to what should be done with the taped program. The overwhelming majority of these teachers recommended that the course be incorporated into the regular senior English class during the school day.

CONCLUSIONS

The program is even now under much more elaborate investigation. We are currently trying it out in both senior and sophomore

English classes. It is being shown as a separate, self-contained entity and also in conjunction with teacher augmentation in reading skills and in practice in literary-type reading.

On the basis of our completed evaluations, however, it is possible to state that the course represented tremendous economy and convenience. Although expensive to produce, once taped the program can be shown at any time during the school year, on any day and on as many days as desired, and at any period of the day, and during these times, of course, several classes can tune them in simultaneously. The *Read with Speed* program made it possible for us to present over TV a program which students could not otherwise have gotten. We managed to produce a program which the participating students judged to be worthwhile, and we managed to do it without adding to our staff or threatening any faculty member's position. We feel that *Read with Speed* represents educational TV at its best.

Measuring Reading Performance

Arthur S. McDonald

Marquette University

The program of this year's Conference amply demonstrates recognition of the necessity of developing and utilizing sound theories of reading. Measurement is useless without a clear theoretical sub-structure. Unless we know what we are trying to find, the utility of our measures will only be a function of our uncertainty.

Measurement of human performance must be multifaceted because of the complexities of human behavior. The meaning of information gathered by measurement techniques must ultimately depend on human judgment. The foregoing statements seem elementary platitudes. Unfortunately, reference to thirty years of reading research will show that little more than lip service has been paid them. Measurement is commonly equated with administration of one or two standardized instruments whose scores are accepted as real units. ("Sam grew 9 months in reading achievement in only six weeks of instruction.") Kingston (3) has pointed out the need for a concomitant advance in measurement techniques and has shown the lack of such improvements.

Perhaps, therefore, it will not be amiss to state how measurement will be used in this discussion. Measurement is considered as the collection, selection and interpretation of data about a student or students relevant to reading performance. Such assessment and apraisal of performance is highly dependent for its adequacy on the appropriateness of the educator's theoretical frame of reference. Innumerable experiences suggest that skillful human judgment, based on adequate theory, can compensate for malfunctioning equipment or poorly conceived measures. For example, on several occasions in World War II, submarine commanders rejected the problem solutions of their electronic computers because such solutions were not consonant with their interpretation of the total situation. Using relatively primitive techniques these commanders achieved their objectives of torpedoing enemy shipping.

Data cannot be collected, selected and interpreted without reference to objectives. What is being measured? Why is measurement being carried on? The effectiveness of any kind of measurement depends on appropriate division of the field of activity into operationally differentiated categories. The establishing of criteria as measures of achievement is also necessary. The *reason* for measurement will be a material factor in determining the *methods* of measurement.

For example, if the purpose is to identify groups of slow, average, rapid and "super" readers, some kinds of rate measures must be chosen. (The defensibility or desirability of this purpose is not the object of this illustration.) On the other hand, should the purpose be that of ascertaining the student's ability to understand a given type of reading, more complex and sophisticated measuring techniques will be necessary.

What type of reading performance does the teacher want to measure? Procedures of assessment will vary as the type is changed. The reading performance of a group of students in relation to a regional or national norm is relatively easy to determine (although perhaps not very useful). Finding out the special instructional and counseling approaches necessary to assist a student overcome specific reading deficiencies presents a measurement problem of quite a different magnitude.

All data secured from people—by whatever means—are samples of performance. Acounts of behavior observed by others, scores on standardized tests, self reports, etc. are all only samples. Obviously, the greater the number of reports, the more varied the situations in which behavior is observed, the larger the number of observers and the longer the period of time covered, the more useful the samples are to the trained interpreter in evaluating behavior.

As the foregoing suggests, there are numerous ways of securing information about performance in a given skill or type of situation. For a number of reasons—not the least of which is conservation of time—the greatest reliance has been placed on standardized tests for measuring reading performance. From a review of the reading research, it would appear that users of these tests frequently forget that they are also only observations of a limited sample of behavior. True, the behavior sample is observed under standard and controlled conditions in such a fashion that one or more quantitative scores are obtained. Nevertheless, the standardized tests are still measures of performance at a particular place and time under certain conditions. Their scores represent a relationship which is believed to exist between standing on the test and performance in real life.

Commonly, in assessing reading performance—for whatever purpose—the standardized tests measuring the familiar triad: rate, vocabulary and comprehension, are used. Despite the accumulation of studies showing the stark inadequacy of such tests, they continue to be used. Although compressed into 40 to 50 minutes, considerable reliance is placed on their sub-scores. Confounding errors are sometimes introduced, e.g. treating *percentiles* as *percent* of comprehension correct. Simplifying constructs are used such as "speed of comprehension." The fallacy of this latter has been demonstrated many times. Are two students with identical speed-of-comprehension scores of 200 performing equally well? Of course the answer depends on the elements making up the score: student A reads 200 wpm and gets all the questions right; student B reads 800 wpm and misses three-fourths of the questions. Are they likely to perform equally well in reading situations? Let us suggest that no one knows. But, speed-of-comprehension scores serve to obscure even the limited data provided by this kind of reading test.

Spache (5) has asserted that general improvement of reading rate does not exist as an entity and has warned that speed is not independent of numerous other aspects of the reading process.

May we suggest rate measures are used because they are easy to administer and score, because rate *appears* to be related to reading achievement, and because group gains after almost any form of training appear with comforting regularity? Many research reports conclude that X method resulted in significant gains in rate with the same or better comprehension.

Commercial speed reading programs have only carried this emphasis on rate to its logical conclusion. Thus, advertisements appear guaranteeing that customers completing Z method of training will be able to read 11.3 times faster with equal or better comprehension to that initially tested. It would not be outside the guarantee, therefore, if a trainee began the program reading 100 wpm with 20 per cent comprehension and ended with scores of 1200 wpm and 20 per cent comprehension. Without suggesting what action any given program would take, it can be observed that the conditions of the guarantee have been met. (Need it be observed, in passing, that guarantees of performance are contrary to the Codes of Ethics of many professional associations including the International Reading Association, National Reading Conference, American Psychological Association and American Personnel and Guidance Association?)

It is time to abandon the enticing constructs of rate, vocabulary and comprehension as exemplified by most standardized reading tests. What is needed, instead, is an indication of how well the student can achieve his purpose for reading.

In measuring reading performance, then, techniques should be used which enable the reading specialist to determine:

(1) Under what conditions and with what kinds of reading material is the student effective, (i.e. able to achieve his purposes for reading)?

(2) Can the student vary his reading approaches to suit the nature of different reading selections and purposes for reading?

(3) When is the student an efficient reader (i.e. achieves his reading purpose with expenditure of time and energy appropriate to the magnitude of the task)?

(4) What deficiencies hinder the student from reading effectively or efficiently?

Measurement of performance usually includes comparing an individual with his class; comparing a group with other groups in school; matching scores against a norm group. Measurement may extend to comparing a student's reading performance with that of an idealized individual who embodies the teacher's standards. (Thus, we get the aspiration to end the program of instruction with all students "reading above average.")

Of crucial importance, although often overlooked, is a thorough assessment of a student's initial reading status, including interacting non-academic factors, in a number of reading situations.

Appraisal of reading performance cannot be satisfactorily carried out unless the educational objectives of the school have been defined in operational terms. Account, also, must be taken of the "institutional press." Does the student *need* to read? Perhaps his instructors *tell* him what he needs to know to pass his courses. Perhaps his curriculum is one in which reading plays a subordinate role—for him, at least. The above statements, displeasing as they may be to persons dedicated to reading, do reflect real life conditions. While this paper does *not* contend that a person is better for *not* being able to read efficiently, nevertheless, for many students reading plays a small role in their lives. Thus, the demands for reading performance of the school must be identified and defined in testable terms.

Competent appraisal demands adequate operational answers to the following questions:

(1) What is the student's current reading performance?

(2) What learning experiences does he need in his school and curriculum to perform at his highest probable level of achievement?

(3) What combination of instructional materials, techniques, independent work and counseling is best for him?

It should be constantly borne in mind that *no* reading test is in and of itself diagnostic. That appropriate appraisal of a student's needs and abilities which is diagnostic can come only from the preparation of a tentative hypothesis based on the analysis of carefully selected data covering significant aspects of the student's life-space. Especially should the appraiser insure that measuring techniques test all facets and aspects of the reading process required to achieve school and student objectives.

Discussions during past meetings of this Conference have shown how complicated and difficult is assessment of improvement in reading for either a group or an individual. Articles by Davis (1, 2) and the review of research by McDonald (4) may be found useful references in this tricky area.

All appraisal must provide protection against invalid judgments because of oversimplificaion, Hawthorne, placebo and Rogers-Dymond effects or appraisor-student bias.

Measurement is only impeded by setting up facile objectives (e.g. "Why can't we read as rapidly as we think?") Useful for research as this may be at the present stage of the art, the previous question is not testable. How fast do we think? What is meant by thinking? Perhaps we can read faster than we can think—if by thinking is meant constructing an entirely new conceptual framework. The author may have presented the new conceptual structure so clearly that the reader grasps it much more rapidly than the writer was able to build it.

On the other hand, we may read a statement relatively quickly and then be slowed up by our thinking about its implications. For example, consider the statement, "a ship which floats displaces the amount of water which is equal in weight to its own." The reader who is familiar with the sea might hesitate to sail on a ship designed by a person making such a statement. A ship which displaces water equal in weight to its own weight will be submerged in a state of neutral buoyancy. This means that a ship will neither rise nor sink. Such a condition will hardly win customers for a shipping line. Did the reader read faster than he thought? Or, was he slowed up by reflecting on the meaning of what was said? Or, did he accept the statement at face value?

Measurement of reading performance, then, requires the selection of data gathering devices suitable to the amount and type of appraisal wanted. It demands the assessment by a trained teacher of the data collected. Such measurement will be used to draw only those inferences clearly supportable by the evidence at hand. The assessment will take into account the sad truths that deductions from *a priori* reasoning are not always borne out in human performance and that *statistically significant* differences are not always of *educational importance.*

A logical *a priori* assumption is that a reader can voluntarily change his reading rate to suit his purpose. We conducted a modest "experiment" on the entering classes of 1964 and 1965 to determine to what extent such a change can take place. 3,500 students were asked to read material differing markedly in readability and conceptual difficulty as well as in purpose. The mean and median scores for difficult material on which the instructions were to read thoroughly with care to understand the author's major premises, supporting ideas and important details were 230 wpm while the mean and median scores for fictional material to be read for what happened to whom and who did it were 270 wpm. Statistically significant, these scores can hardly be considered educationally important.

300 students were asked to read non-fiction history selections "as fast as you can. You will not be asked questions about what you have

read." The mean score was 400 wpm. When the instructions were varied to say, "Read this passage as fast as you can. When you have finished, you will be asked questions about its meaning;" mean score was 240 wpm. Purpose had been changed from "eyeballing the print" to some form of reading.

This study–congruent with more defensible research–is cited merely to verify the complexity of reading behavior and to illustrate the difference between statistically significant and educationally important behavior. It also exemplifies the need to assess student perception of the measurement task.

Above all, then, the meaning for the student of the situation in which the data were collected must form part of the final judgment about performance.

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1965 Review of Research in College-Adult Reading

Emery P. Bliesmer
The Pennsylvania State University

The major portion of research reports treated in this year's annual review are ones which have appeared in the periodical literature during the past year up through September, 1965, and which were available to this reviewer during the past two months, the time during which this review was being prepared. A number of reports previously appearing in the literature, but in sources not readily available to this reviewer at the time of preparation for last year's review (4), have also been included, as has also a number of other reports which, for various reasons, were not referred to previously. In accordance with the custom established during previous years, the various research reports are treated under a few broad major headings. As will be noted, the greatest number of reports, by far, was found to be relevant to the broad area, "Factors Influencing Reading and Study Skills and Habits," with the next greatest number falling in the general area of "Reading Programs."

As in the past, a considerable number of pertinent reports included or involved descriptions of college reading programs, although the major intent of many of these reports was not one of reporting or describing. (3; 8; 22; 26; 34; 36; 40; 41; 45; 49; 50; 60; 61; 65; 71; 72; 77; 82; 86; 94) Two reports were concerned with surveys of reading programs. Aukerman (1) sent "opinionnaires" to 300 state college and university presidents. He analyzed the 138 usable replies he had received from presidents who stated that they had reading programs and who indicated a definite commitment to and support for such programs. Thurston (86) reported a questionnaire survey of college reading programs in Louisiana and Mississippi. Of twenty-seven colleges responding, twelve reported having programs; thirteen of fifteen which reported having no program indicated they would like to have such. Considerable variation and inconsistencies among various college programs were indicated.

A number of studies were concerned mainly with evaluations of specific programs (3; 43; 45; 61; 63; 72; 77). Beasley (3), evaluated a reading program at East Tennessee State University in terms of gains at the end of the program, gains retained a quarter later, students' evaluations of relation of reading courses to academic adjustment and their self-appraisal of reading ability, and other criteria. He concluded that the college program had produced significant and lasting gains in reading skills, that the practice of assigning students of low grade-point tendencies was justified, and that skills gained had transferred favorably to students' study habits and academic performance.

Gains in rate and comprehension were reported for some programs (45) and in rate, comprehension, and vocabulary for some (72). In a reading and study skills program at the University of Maine (61), no significant differences were found between a reading and study skills program group and a control group (who had been superior initially on pre-test scores) with regard to vocabulary; but significant differences favoring the experimental group were found with regard to comprehension and rate gains. Ross (77), evaluating the progress of three groups in a voluntary reading program at the University of Kentucky, found significant test score gains in only comprehension one semester, only rate another semester, and both rate and comprehension a third semester, with vocabulary gains not being found significant in any semester.

Parker (63), investigating effectiveness of a University of North Carolina reading program, found rate listed as one of the major interests in the program by 75 per cent of the students, comprehension by 58 per cent, spelling by 57 per cent, and vocabulary and study habits by 32 per cent. He found median per cent increases in rate to be almost 100 per cent (or over 212 words) and on comprehension, -.374 per cent. Per cents of change in post-test scores obtained 5 months later were found to be -5.64 per cent for rate and 1.85 per cent for comprehension. Correlations of differences in grade-point averages before and after training with rate scores and with comprehension scores were not statistically significant. All of the scores obtained with various tests in a program for University of Texas law students, reported by Heard (34), indicated definite increase in rate and at least maintenance of, if not slight increase in, retention skills. Statistical tests of results were not indicated. Students tended to react quite favorably to the program and consistently suggested that a regular law case book be used as a text for the course.

Bunger (8) interviewed and administered the *Gilmore Oral Reading Test* to 243 adult participants in a state-wide telecast of "Operation Alphabet" in Florida. Approximately two-thirds of the adult students were found to test at less than 3.0, the lower limit set for reading success. The conclusion was reached that the over-all program had not been successful, that group work seemed more beneficial than individual work, that a study guide intended for home use by students did not help, that regularity in watching telecasts did not assure reading improvement, and that the telecast did not significantly affect enrollment of public school adult literacy and elementary education classes. Henney (36) reported the results of using a "Family Phonics

System" with functionally illiterate reformatory inmates. He concluded that age, IQ, and initial reading level were not of significant influence on the reading progress of individuals and that the particular system used and studied could be used to improve reading skill of functionally illiterate adults as effectively in group as in individual situations.

Friedman (26) found the cloze procedure as effective in bringing about improvement in comprehension and vocabulary-in-context test score gains as "close reading without deletions" for classes of foreign students at the University of Florida. She noted indications that cloze procedures might be superior to close methods in effecting vocabulary improvement.

College presidents responding to Aukerman's opinionnaire (1), while indicating definite support for reading programs, indicated a need for substantive and definitive data with regard to effectiveness of reading programs in promoting significant academic gains. Ketcham (43) reported that the returns he received from faculty members in various Pennsylvania colleges indicated that a reading program belongs in college; that 94 per cent believe students referred to programs were helped; that half of the respondents indicated sending average and above average, as well as below average, students to reading and study courses; and that all were of the opinion that gains of various types had been made by students.

A number of reports were concerned with the evaluation or comparison of various methods used in programs. Several involved the comparison of machine-oriented and materials-centered approaches (41; 50; 60). Jones and Carron (41) found that a group of scientists and engineers in a machine-centered program and a group in a book-centered program both gained significantly in rate, comprehension, and "reading efficiency index;" but gains were not significantly different. On follow-up testing 16 to 18 months later, differences in mean rate gains were not significant but the non-machine group showed significantly larger gains in comprehension and "reading efficiency index." Long (50) found a college reading improvement class who had used printed materials and a group who had used mechanical devices to have achieved equal gains in rate and level of comprehension; but the materials group made significantly greater gains in paragraph comprehension. Both groups made significantly greater gains over a control group. Nikas (60) compared progress made by a teacher-oriented reading improvement group one semester with that made by a machine-oriented group the next semester. He found no significant differences in gains made by the two groups. He did find significant correlations between gains made and grade-point averages for the teacher-oriented group but not for the machine-oriented group.

Experimental groups in one reading program who had had their regular program complemented with instruction in listening did not achieve significantly greater in either reading or listening than did control groups who had instruction confined to reading improvement. (49)

Pauk (65) compared gains made by college students in a six-session study skills course, in which participants were told that speed had no place in academic settings and that only study skills and techniques would be taught, with gains made by participants in a fourteen-session study skills course. In the latter, the first two sessions were devoted to instruction in use of reading pacers which were used during the entire course; the following six sessions were on study skills (identical to the first program); and the last six were on reading comprehension skills. He found both reading groups made significantly greater grade changes over control groups. While the grade-point gains of the six-session group were approximately three times greater than the gains of the fourteen session group, differences were not significantly different. Investigating in a field closely related to college reading improvement programs, remedial English, Dorough and Shapiro (22) found no significant differences in final examination performance between a group of subjects who were taught remedial English with a specially prepared program utilizing a teaching machine and a group of "lecture" students who were taught by the "conventional" method. Fewer students in the programmed group were found failing to complete the course satisfactorily and fewer were performing at levels above average.

A number of studies did not involve college reading improvement programs directly but yielded indications which might possibly have indirect implications for such programs. Geiger (27) devised cards for associative learning tests which supposedly simulated phonic and sight approaches to reading instruction. A group of 27 college students were found to do better on retention tests with visual-auditory cards than with visual-visual stimuli. So did a group of kindergarten children; but the latter group exhibited a much larger gap between visual-auditory and visual-visual scores than did the college group. Gulo and Baron (30) found that when presentation time was held constant, more efficient learning of meaningful prose material resulted with a group of college students who had had material presented through direct reading than by any group who had had material presented in one of three methods of auditory presentation. A group of British grammar school pupils involved in a study by Poppleton and Austwick (69) learned note-taking skills better when using a form of programmed instruction than they did when given comparable materials in a book and told to use the book as any text book and to make such notes as they wished. A group of post-graduate diploma students, however, attained the same level of achievement from both forms of the note-taking program. University students using a programmed text in a study conducted by Ripple (75) performed significantly better on a test both two days and ten days after an experiment than did groups who had read materials in a conventional text or who had listened to a lecture on the materials. Differences between groups who were exposed to materials through conventional and lecture (listening) methods were not significant.

FACTORS INFLUENCING READING AND STUDY HABITS AND SKILLS

A considerable number of research reports has yielded direct or indirect implications with regard to factors influencing reading and study habits and skills. Groups of Miami University (Ohio) students were found to improve significantly in rate and vocabulary scores (Nelson-Denny Reading Test), but not comprehension, while enrolled in language art courses, regardless of instructors or course content and emphasis (2). Maxwell (53) reported finding that students read significantly faster when instructed to read faster than did students who were told to read at a normal rate and that students read significantly faster when instructed to read faster on a second test than when so instructed on the first test. Groups which practiced "three or four times" according to handouts containing practice suggestions to be followed for a week had higher post-test rate and greater gain than did groups which reported practicing "once or twice" or "every day." Maxwell raised a question with regard to optimum length of time for a reading program to change reading patterns. Jackson (40) found that students with higher quantitative than linguistic SCAT scores made lower gains in a voluntary reading program at the University of Illinois and in proportion to differences between Q and L scores than did participants who had higher linguistic scores.

In studying social variables associated with the frequency of book use among a group of British college students, Taylor (85) found only two of a number of variables significantly related to reading and book use, social class and "early awareness of a person or event engendering a love of books." Among findings in a study of influence of mobility and work patterns upon newspaper reading habits (5) were that various media (daily newspaper, weekly newspaper, and television) apparently served complementary rather than competing functions. Carter and Clark (13) found, that, while interest in integrative news was unrelated to any of the social characteristics studied with respect to urban and suburban readers of the *Minneapolis Star*, interest in destructive news appeared to be negatively related to education and social class. Wilcox (96) concluded that graphic presentation of statistical data in a news story was superior in producing reading comprehension on the part of readers to methods with only text form presentation or text form plus tabular presentation of data.

Buck (10), in his study of Mississippi Negro college students, found no relationship of students' reading achievement to education of parents or to home background indices. Conant (17) found significant differences in eye movements and efficiency of comprehension of 97 college students over four levels of experimental reading selections, with indications that both increasing difficulty of selections and individual differences in reading efficiency played a part. Results of a comparison of latency of visual perception with that of touch of forty hospital staff volunteers were consistent with the hypothesis that intermodal differences in perceptual latencies (visual and touch) are related to corresponding hierarchies of speed in reading and tapping, with the relationship most evident among older subjects (20). Laubach (48) found that the communication skill of adults (with less than five years of schooling) in an elementary reading class increased by use of specially written materials; but no significant differences were found with regard to different ways of writing special materials. Since mean reading scores attained with special materials were low, Laubach urged caution with regard to use of special materials as independent channels of communication for adults.

Three groups of University of Utah undergraduate subjects were involved in a study of learning through various sensory modalities (91). One group learned nonsense syllabies, a second lists of words, and a third words "with constraint," with visual, auditory, and audio-visual modes of presentation being used with all subjects. No significant differences were found between visual and audio-visual modes; a slight trend was noted for auditory to be inferior to visual at shorter exposure times; and, with nonsense materials, the auditory mode was found to be significantly inferior to the other two modes.

A number of other studies were concerned with factors of conviction and/or persuasiveness. Four groups of college men who had publicly committed themselves with regard to positions on an issue were found to be less certain of their positions than those who were not so committed; and both groups preferred and were interested in reading articles which would support their positions (56). In a study of effect of degree of perceived choice upon resistance to persuasion, Freedman and Steinbruner (25), found college students significantly less likely to change ratings of applicants for graduate study when original information was discrepantly unfavorable. In studying effects on changes and opinions of students of temporal positions of information about the persuasive intent of a communicator, Kiesler and Kiesler (44) found no significant differences between a controlled and a forewarned condition. Subjects in a no-warning situation changed opinions significantly more than did a control group; but subjects in an after-warned condition did not; subjects in both after-warned and no-warning conditions changed opinions sigificatly more than did the fore-warned subjects. Manis and Blake (52) found that subjects receiving prior immunization (exposed to positive statements about a topic presumably written by a highly authoritative person) were more resistant to changing both their ratings of a communicator's probable agreement with an opinion statement about the topic and their own opinions than were subjects who had not been immunized.

The role of personality factors in reading behavior continued to be a topic of interest or concern in a number of studies. Sperazzo and Schurr (82), finding no significant differences between pre- and post-test *California Psychological Inventory* mean scores of an experimental group of undergraduate male participants in a Georgetown University reading program and a control group, interpreted the results as not supporting previously reported conclusions that measurable personality changes occur as a result of a reading course. Several other investigators, however, reached contradicting conclusions. Jackson (40) concluded, on the basis of gains made, or not made, by students with various specific cases of maladjustment manifestations (according to MMPI scores) that reading gains achieved were a function of adult personality and that treatment and diagnosis of personality deviations were necessary if reading programs were to be effective for approximately 40 per cent of their participants. Comparisons of MMPI scores of 228 University of Minnesota program participants with a control group, by Raygor and Wark (73), indicated that, among men, verbal skill and lack of social skill differentiated good from poor readers; but among women poor readers seemed to be better adjusted psychologically than the typical female freshman. "Weak but significant negative relationships" of neurotic aspects of personality (according to MMPI and Kuder Preference Record scores) to reading performance were obtained by Neal (59).

Hyatt (37) and Parker (62) have reported intensive studies concerning factors influencing the use and users of library services. Hyatt (37) interviewed approximately 575 adults to determine effects of special resources and services offered by libraries in depressed areas of Baltimore and Cleveland, with 79 adults with less than eighth grade education being given intensive interviews. Among factors favoring library use and effectiveness were the very location of a branch library in a depressed neighborhood, accessibility of librarians for help, involvement and participation of the library in community programs and planning, individual contact with adults, collections of readable books for adults, and a number of non-library factors. Parker (62), in a study to determine the effect of television upon library circulation in matched pairs of Illinois towns which were early and late receivers of television, found a significant decrease in library circulation had occurred, with the decline in fiction circulation significantly greater than that for non-fiction.

Many investigators continued to be interested in or concerned with factors influencing word perfection and/or recognition. While many studies have only very remote or tangential relation to development of reading and study skills, possible direct and indirect implications may be found in some. Clarke (16) found that provision of syntactic information significantly increased the verbatim and the correct form class replacements of groups of college students attempting to replace missing words in messages, as did provision of referential information also. Verbatim scores under syntactic information were influenced significantly only in the case of function words, while referential information did not increase readability of function words more than semantic words. Heim, Ramsay, and Watts (35) found two groups of university students and a group of navy men making unwitting adaptations to difficulty level of content in which words were presented when making judgments of familiarity of selected obscure words. Subjects tended to judge obscure words as unfamiliar when these were presented along with relatively easy words but tended to judge obscure words as familiar when presented with the same number of extremely difficult words. University students were found to be influenced most in judgments of complete unfamiliarity while naval men were influenced most in judgments of complete familiarity. Schiller (79) found that backward masking effect (perceptual interference resulting when briefly exposed stimuli, such as letters, were followed shortly after by a second stimulus) was greater when the test and the masking stimuli were identical than when the task involved location of a letter stimulus; but when testing tasks involved identification of a letter or stimulus, masking effect was greater when test and masking stimuli were different. In a study involving 24 female Canadian college students, it was found that word lists of higher "vividness" ("ease with which you can picture something in your mind") were learned more readily than lists of low vividness, when the two types of lists were similar with respect to "meaningfulness" criteria. Worthington (98) found the rate of dark adaptation (length of time required for subjects to report awareness of light for words) of 12 male college students to be significantly longer for two "taboo" words (four-letter words socially unacceptable) than for two control words structurally very similar, with no evidence of generalization to structurally very similar stimuli. This was interpreted as evidence of "perceptual defense phenomenon."

A number of other studies involving tachistoscopic recognition, identification, and other behavior also lend possible further significance and insight into word recognition and perception behavior. Dornbush and Winnick (21;97) found significant right-left retinal differences in identification for words and for paralogs (nonsense letter combinations) which closely approximated English letter sequences or words. They interpreted their results as being further support of the view that right-left retinal differences in tachistoscopic identification were related to previously established reading habits. Harcum (31) found that partial information about a word ;obtained through pre-recognition tachistoscopic exposure to the word, did not effect subsequent recognition and accuracy of 24 undergraduate students with respect to "predictable" words, as compared with recognition accuracy of non-predictable words (ones not given pre-recognition tachistoscopic exposure). Tulvig and Gold (89) obtained data from 1,000 University of Toronto undergraduates which confirmed their hypothesis that visual duration threshold varies inversely with the amount of information provided by the context of a target word. In another study, Harcum and Friedman (32) were interested in the direction of reproduced tachistoscopic patterns of 10 Israeli students, for whom Hebrew was the first language. The investigators found that the hypothesized right-to-left direction tendency was not confirmed; but they did find fewer errors to the right than to the left of fixation.

In Haslerud's investigation (30), words were presented tachistoscopically to a group of college females at three rates (at the predetermined base threshold of each individual and at one-half and at three fourths of the base threshold) and at three intervals between trials (five, ten, and twenty seconds), up to ten repetitions per word. They found very few words perceived within ten repetitions at one-half of the base threshold, regardless of the interval between trials; but at three fourths of base threshold, only 3.3 to 4.5 median repetitions were required for the various delays. In Koplin and Spielberger's investigation (23) the recognition thresholds of 36 college males for nonsense syllables presented tachistoscopically varied directly, rather than inversely (as predicted) with meaningfulness and were not found to be a function of high or low verbal ability (SAT scores). The women in an investigation reported by Miller and Solkoff (55) showed no differences in recognition thresholds for "taboo" and for "neutral" words; but the men had a significantly higher threshold for spoken "taboo" words than for written ones. They also found that sex of the examiner had no effect and that no general defensive reactions to taboo words were evidenced. The visual duration threshold of a group of English University women students was found to be significantly lower under high probability context (frequency of occurrence) conditions than under low conditions in a study reported by Morton (57).

Still further implications for word perception and recognition behavior may be afforded by some of the studies concerned mainly or in part with eye movements behavior. Conant's study (17) has been referred to previously. Gould and Shaffer (28), in studying eye movements of three college students during visual scanning of numeric matrices, found that while average duration fixations remained relatively constant (whether on target or non-target digits) the time to scan varied significantly with both the target (digit sought for) and frequency of appearance of the digit. In a related investigation by this pair (78) a group experienced in tachistoscopic training scanned more quickly and with significantly fewer fixations, but with significantly more errors, in determining the frequency of appearance of a pre-designated digit target than did a non-experienced group. Scanning time varied for both groups as a function of the particular digit for which subjects were looking and the frequency of appearance of the digit. Frackenpohl (24) described an attempt to train visual motility ("the ability to make ocular excursions with facility and competence") of 31 subjects, some of whom were adults. She reported that there were "no absolute conclusions which can be drawn from a study of this sort."

READING, STUDY, AND OTHER HABITS, TRAITS, AND SKILLS

Several studies yielded information concerning newspaper and magazine reading habits and patterns. Among findings in an investigation by Bogart and Orenstein (5) of influences of mobility and work patterns upon newspaper reading habits were that 89 per cent of the people in the representative city studied read one or more newspapers "yesterday," an average of 1.8 per reader; 78 per cent also watched television. Data obtained by Bostian and Ross (6) from over 500 Wisconsin farm women indicated a generally favorable attitude toward print media (rather than to television), especially toward farm magazines, with strong ratings being given to daily newspapers and to women's magazines also. However, the time spent with mass media definitely favored television, the most unfavorably ranked medium. An average of 2.6 hours per day was spent with television in contrast to 28 minutes per day with daily newspapers and 2.7 hours per month with farm magazines. Availability of and time spent with media appeared unrelated to either function or favorable rating. Newspapers were found to be the chief source of news for 500 California adults interviewed by Carter and Greenberg (12); but television was regarded as a more reliable source in case of conflicting reports. Root and Root (76), analyzing and comparing magazine circulation figures over a twenty-five-year period, found that in 1963 one-eighth of all Americans bought one of the following popular magazines: *Cosmopolitan*, *Life*, *Look*, *Redbook*, and *Saturday Evening Post*. They also found that specialized magazines showed particularly strong gains, as did also serious magazines; that news magazines gained less in circulation than did other specialized types; and that the growth rate of popular

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mass magazines was less than either specialized or serious types. Westley and Severin (93) found, relative to Wisconsin newspaper non-readers, that newspaper reading was related to not having TV, but not related to having a radio set, and that the non-reader was of lower socio-economic class and was usually in his twenties or in his seventies.

Six hundred-forty freshmen studied by Brown (7) were found to have poorer study habits and more negative attitudes toward school after approximately a year of college experience than before. Burns (9), in an interview study of a group of university students who had scored either high or low on a reading test, found that "some apparently successful college students have inadequate conceptions of the reading process and its potential for learning, have poor reading habits, and avoid reading as much as possible." Among identifiable characteristics relative to reading found by Buck (10) for entering students in senior Mississippi colleges for Negroes were a range of reading ability from fourth grade to college freshman levels, with the greatest cluster in the seventh and eighth grade range, an average slightly above eighth grade, and women slightly better than men. Hiltunen (38) surveyed all daytime students 22 years of age or older who were enrolled at L.S.U. in New Orleans for the first time in September, 1963, and had completed less than thirty hours of previous college work. High percentages of both sexes were found enrolled in remedial mathematics (78 per cent of the males, and 83 per cent of the females); but the reverse was found in the case of remedial English (28 per cent males and 20 per cent females). (Unofficial figures for general freshman enrollment in remedial classes indicated about 35 per cent in remedial English and about 50 per cent in remedial mathematics). Among findings in a survey of over 1,400 Cornell freshmen, reported by Pauk (64), were that girls read thirty per cent more books than boys but that boys read 30 per cent more magazines; that 58 per cent of the girls, as against 32 per cent of the boys, read poetry for self-enjoyment; that boys watched television at home more than girls; and that more than twice as many girls as boys read aloud to themselves for enjoyment.

A number of reports of habits and patterns of reading of natives of various foreign countries has appeared in the *Journalism Quarterly* in recent years. Eighty-six per cent of the Chileans involved in one investigation reported reading a daily newspaper, with the reading of newspapers, books, and magazines varying according to social class. Only 3 per cent had television at home, while approximately 90 per cent reported having radio and listening for approximately three hours per day (14). In a survey of Ghana citizens made by Griffin (29) a number of findings concerning age and characteristics of readers, type of material read and frequency with which read, and further needs with respect to types of materials were obtained. In a questionnaire study of adult newspaper subscribers in India, similarity to development, patterns, and differences in reading habits in America were found, including the finding that self-motivation rather than motivation by outsiders, such as teachers and friends, prompted reading of newspapers (51). Use of mass media was found related to socioeconomic status for University of Costa Rica students (54). It was also concluded that use of mass media was relatively comparable with that of high status Latin American adults and with United States midwestern city adults. Fagan (23), studying communications media growth in 50 "less developed" countries, found a net loss in newspaper circulation but not in radio, over a decade.

Using time sampling methods, Hinricks (39) found that ten per cent of the day was the average amount of time spent in reading by a sample of some two-hundred chemists and chemical engineers, with about 25 minutes a day (over half of the reading time reported) spent on materials connected with their companies or work. Twenty-four young adults studied by Silver and Hagin (55) ten years after initially having been diagnosed as having reading difficulty because of some perceptual or neurological defects, were found to have matured in some areas; but the group was significantly lower in intellectual level, perceptual difficulties tended to be retained in all areas, and neurological and perceptual difficulties were not only retained but marked.

Mueller (58) studied the relation of newness of books to circulation rate in six Chicago suburban public libraries. She found old title circulation rates fairly similar for all six libraries; but three had high title rates while three had no substantial differences between new and old title circulation rates. The size of community, educational and income level, and extent of library use related to differences in new title circulation; but it was also found that librarians could affect library use in specific and measurable ways, especially with experimentation with differential accessibility of parts of a library collection. In studying use of local libraries by Negro and white women in low income areas of Chicago, Peil (66) found that, while incomes of the white group were higher, a higher proportion of Negro women were high school and college graduates. Over a fourth of the women studied had used the library in the past year.

INFLUENCE OF READING AND STUDY HABITS AND SKILLS

A number of prediction studies continue to have implications relative to influence of reading and study habits. Brown (7) found high school rank and aptitude measures better predictors of grade-point average of college freshmen than were indices of study attitudes and habits. Righthand (74) found a combination pattern of mathematics portions of an aptitude test and *Survey of Study Habits and Attitudes* scores most effective with respect to discriminating between groups of technical institute dropouts and groups of persisting students (all males).

Seegers and Rose (80) found no significant differences between a group of dean's list students and a group on academic probation, at the University of Kentucky, on reading rate or vocabulary test scores; but the honors group was found to be significantly superior in verbal comprehension. In a study (42) of students readmitted to course work at the State University of Iowa after having been previously dropped for poor scholarship, one group was required to achieve only minimal grade point average, that required of all the students, while a second group was required to achieve an individually determined minimum grade-point average which, in effect, was higher than the one required of all students in general. No comparisons of pairs of groups or subgroups with respect to various *Iowa Placement Battery* subtest scores, including reading comprehension scores, revealed significant differences. Carter (10) studied 23 adult males who had been retarded readers in the upper grades and 12 who had been non-retarded. He found 70 per cent of the "entry jobs" of the retarded readers were unskilled or semi-skilled, that vocation motility and ambition were horizontally oriented for the retarded reader, and that the dropout rate for retarded readers in a vocationally oriented curriculum was 70 per cent.

MISCELLANEOUS (TESTS AND TESTING, READABILITY, AND OTHER)

A number of studies involving tests also has implications for reading programs. Chansky (15), obtaining correlations between various scores of the *Minnesota Multiphasic Inventory* with *Cooperative English Test* reading scores, interpreted his findings to indicate that test scores "contained the psychometric elements of carelessness and lack of understanding of the items and response bias." He suggested controlling carelessness and test taking attitudes to avoid erroneous diagnoses of reading behavior on the basis of standardized test results. In a study of psychological tests for the selection of training nurses, Phillips (67; 68) found that the minimum of four tests which could comprise an effective test battery (give best predictions of results of an examination) included tests of word knowledge. Preston (70) found that a group of University of Pennsylvania freshmen received better-than-chance scores when they were given part of a widely used reading test without the reading passages, as an "information test." Scores obtained when the test was given in the regular way were significantly related to scores obtained with the passageless "information test." Rankin (71) presented results of a study in which crude gains (difference between pre-test and post-test scores) of students in a reading improvement program were compared with residual gains (deviation of final scores from the regression line of final on initial scores).

Comparing grades based on both crude gains and residual gains, he found approximately 50 per cent agreement for the group as a whole, but agreement greater for students who received a grade of C than for those who received grades above or below. Among factors identified by Weaver and Kingston (92) in a study of eighteen tests relative to reading and language, including eight cloze tests, were "redundancy utilization," "flexible retrieval," and "verbal comprehension."

Readability features of newspapers and other materials continued to be a topic for study, also. Danielson and Bryan (18) in a readability analysis of North Carolina Associated Press wire news stories, found only 12 to 18 per cent of stories in the categories of sports stories, crime, accident, and human interest were written at the seventh grade level or higher; but forty-two to fifty-seven per cent of the stories in the areas of defense, diplomacy, business, politics and government, and public moral problems were at seventh grade or higher levels. Studying readability of three conservative and three more sensationally responsive newspapers at three different periods, Stevenson (83) found a low point of readability for the three conservative papers in 1872 with a gradual, but not significant, increase or gain up to the present. Sensationally responsive newspapers were found to have risen and fallen in readibility. In another study (84) various analyses of inherent communication potential of type faces were made. Reactions of various types of journalists led to a conclusion that the findings provided a definite basis for use of typography as a code for communication of connotative variations. Davenport and Smith (19), in a study of possible effects of various typographical factors on newspaper readership in Cincinnati, found that readability (as determined by the measures of words read, time spent in reading, speed, accuracy, comprehension) apparently is not affected by major body type size and treatment changes. Tinker (88) found that college students gave "pleasingness" ratings very similar to those given for apparent legibility in the study of effect of variation of type size, leading, and line width upon legibility. Wiggins (95), in a study of effect on reading speed of letter and line length and spacing, reported that "findings in the two eperiments are applicable only with the population in the experiments or to comparable populations and any extension to other population should be made only upon a judgmental basis." Kitross (46) found none of three procedures for predicting interest value ratings of materials (cloze procedure, interpolation of an orally-read interfering message, and proofreading) to be superior to any of the others.

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